ANNALS
OF
OTOLOGY, RHINOLOGY
AND
LARYNGOLOGY

INCORPORATING THE INDEX OF OTOLARYNGOLOGY.

VOL. XXVIII. SEPTEMBER, 1919. No. 3.

XXX.

OBSERVATIONS ON OTOLARYNGOLOGY IN THE WAR.*

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The paper which follows begins with a few pessimistic paragraphs on "personnel." Then it takes up the two special hospitals of the Division of Surgery of the Head and describes a day at Cape May. After this it deals with oral and plastic surgery, a subject which overlaps with otolaryngology as many of us practice it. I have tried to be generous with Colonel Blair in the division of these cases; in fact, on paper his section has control of them all, so that I feel that my observations such as they are, and fully half of them were assembled in 1915 while I was serving with the British, are within the proprieties. The subject of oral and plastic surgery finished, the paper takes up Otolaryngology

*Presented before the College of Physicians of Philadelphia, 1919.

in the United States, discussing in order the prevailing bacteria of the epidemics, carriers and the use of dichloramin-T. These subjects are followed by a tabulation of the number of operations, and the paper concludes with a statement of some new clinical observations made in the cantonments and a brief report on the influenza epidemic from the standpoint of otolaryngology. You will see, as the paper proceeds, that it is largely made up of pickings from other men's brains. I have tried, however, in each instance to give due credit.

About a month ago, at a luncheon where five medical officers were enjoying the comradeship which comes with service, this story was told. A ward of recently returned overseas patients at a certain southern cantonment began to manifest a spirit of superiority over their fellows who had not seen foreign service. They refused to salute officers who wore the silver chevron, and were continually guilty of infractions of hospital discipline. Finally, the officer in charge called them together and said: "Your continual disregard of discipline must stop. Get the idea out of your heads that you are all heroes. There may be one among you, but he is not now playing the part. The real heroes are the people who will have to live with you for the next few years." All who have been in the service should keep the moral of this story in mind. There will be times when this will not be easy to do. I confess that it is going to be especially hard for me to manage it, because the war has stimulated a tendency which I have to preach. I have never been so strongly tempted to unburden myself as tonight, because we have just passed through one of the most dismal phases of the war—the period of demobilization. There are no illusions now. It is pretty much every man for himself. The papers are full of recriminations and investigations. Capital is being made out of every angle of the war. Writers play for sensation by marshaling half truths and by convenient omissions. We have almost reached the point of attributing every vice to the Germans and every virtue to ourselves. Greatness of purpose too often is showing the yellow streak of quick reversion to self. America has done even more than the expected thing—has

played a more or less prepared part splendidly, and the goal is gained. Why is it necessary to refight the war in the gutter?

Eighteen months ago the word "personnel" meant but little to me. Since then its letters have been burned into my brain.

SPECIAL HOSPITALS. The Division of Surgery of the Head established two special hospitals and the Section of Otolaryngology is, of course, represented in them. The first hospital is at Cape May in this country and the second at Vichy, France. Both are housed in elaborate hotels at summer resorts. The negotiations leading to the securing of both of these places were somewhat complicated and protracted.

No. 115, as the hospital at Vichy is familiarly known to those of us in the office of the Surgeon General, has not yet functioned exclusively as a special hospital. Before the personnel selected for it arrived the Château-Thierry drive filled its beds, as well as those of all the other American hospitals, with general surgical cases. One of the younger Boston otolaryngologists who is with No. 115, wrote to me as a matter of news and without a shadow of complaint, because he is a soldier first and a medical officer and specialist afterward, that he was busy all day long dressing compound comminuted fractures of the femur. The ward under his charge was filled with them. Had the war lasted, this hospital would have come into its own. Also, had the war lasted, its special equipment which it parted with at the dock in America would have reached it, and it was a good equipment, even if I do say so, and even if I did pick out a part of it. If the full equipment is ever assembled—especially if it should be put into the special building designed for it—the hospital will surpass anything that I saw in France and would compare favorably with the Face and Jaw Hospital at Sidcup, England.

Speaking of specialists turning to and doing general surgery reminds me of the following story which has drifted back to the States: An ophthalmologist of No. 115, who had been swamped like everybody else with fracture dressings, said to a friend higher up, "Can you not send me some-

thing besides legs? I don't know anything about them and never look at them except in society."

Here is another story in another vein from No. 115. It comes from Pierce, the chief of the section of otolaryngology. Before he reached Vichy, and while still en route, he wrote: "Tell them (meaning his friends at home) that here I am suffering and bleeding for my country. I have just come from the Grand Opera."

There has been, however, some special work done at No. 115 because Major Ivy reported that the section of maxillofacial surgery had treated in four months ending January 18, 1919, on which date the last patient of this character was ready for discharge, 305 cases.

Recently, I spent a day at Cape May. Briefly, this is what I saw. I arrived just before noon and walked in on Captain Berry doing a Killian and Major Frazier freeing a musculospiral nerve from a callous. There was a round up of cases after lunch for General Lyster and for me to see. First we were shown the jaw cases. These, perhaps thirty in number, ranged from simple fractures to fractures in which there was a loss of half or even two-thirds of the lower jaw. The dentists at Cape May have a unique opportunity, as they see and have a chance to compare all the results of the different types of splints which are put on overseas. This splinting work, as you know, is one of the best American contributions to the surgery of the war.

The oral plastic work at Cape May so far has consisted mostly in operating depressed and sunken scars of the face, many of them large. There have been a few cases in which a part of the upper or of the lower lip was missing. I saw one flat nose and two cases where a bullet had gouged out one eye and then had taken away the root of the nose, leaving a furrow at that point the size of the tip of the index finger. Col. Blair says that this type of case is not uncommon. I saw it at Cape May for the first time. While General Lyster was looking at a group of fundus cases—a group which Col. de Schweinitz and Col. Parker stated they never saw equaled—I looked over the otolaryngologic patients. There were some well done radical mastoids, as was to be expected. Among the more distinctly war cases

were three gunshot wounds of the larynx. Each wore a tracheotomy tube and each had a discharging sinus leading to necrotic cartilage. Dr. Jackson had kindly seen these cases and advised on their treatment. There was one case in which a small shell fragment was lying innocently deep in the pterygoid fossa and another in which a fragment lay above the level of the hyoid bone in the prevertebral space. In a third case there was a sizable fragment in the posterior ethmoid region or in the sphenoid sinus. All these cases were without symptoms and will probably not be operated. There were three cases of partial facial paralysis caused by a bullet entering the eye or the region of the malar bone and emerging through the mastoid or taking the reverse course. Naturally, they were complicated by a partial or complete atresia of the cartilaginous canal, and it was a nice problem to decide whether operative interference was worth while. There were a few deformed or partially destroyed ears. The cases of facial paralysis were clearing up. Major Frazier had operated one case of complete facial paralysis, anastomosizing the facial and the hypoglossal.

There were five or six cases of destruction of the upper or the lower lid or of some part of the bony framework of the orbit. The ophthalmologists had been busy doing plastic operations on these in order to restore the lids and to make a pocket into which an artificial eye could be placed. I have never appreciated before how much an artificial eye means to a patient. It makes him much less depressing to those who have to associate with him.

General Lyster, Lieut.-Col. Allen, the temporary commanding officer of the hospital, and I had dinner with Major Ingersoll and spent the evening talking war and the army.

At nine o'clock the next morning Major Ingersoll did a tonsillectomy, with the patient in the modified Rose position, and I picked up some pretty points in technic. Then came a dramatic demonstration of the methods and results of the school of lip reading. The limitless patience and enthusiasm of the teachers is overpoweringly fine. As I first went about the hospital the patients were assembled in the wide corridors of the hotel and in the midst of their setting-

up exercises. These are graded to suit the patient's disability. Soldiers with partially paralyzed arms or legs are encouraged and helped to play games in which they throw or kick a ball. Next I saw the cases of hemiplegia from gunshot wound of the brain. These patients were having their massage and their exercises in the use of compensatory muscles. Major Frazier has made a beginning at a museum of casts and drawings. I saw this and went from here to the studio where Mrs. Chesney has her plaster models of the face and her artificial ears, and where also Serg. ——— has more drawings of operative findings. He is a sculptor by profession, and as a side employment has made statuettes of certain members of the staff. The one of Lieut. Bigelow is an epecially good likeness and very martial. A head of life size of this officer's baby I found, on comparing it with the original, who lives in a cottage near by, to be splendidly done. I felt like asking to be assigned to Cape May in the hope of seeing myself in bronze—or rather in bronze plaster—before I die. I went into another operation by Major Frazier and saw him fill a defect of the frontal bone by means of a graft of pericranium and outer table of the skull. Here, again, I enlarged my knowledge of technic. During my visit I saw skin grafts cut under vaselin—the Parker method—which was new to me. If I can only apply some of the things which I have seen in the war, my patients, if I have any when I get home, will benefit largely. In the afternoon Captain Cross did a plastic of the right lower lid. I came away from Cape May feeling very proud that the Division of Surgery of the Head had fathered such an upstanding hospital.

The number of special cases which will return from overseas for treatment is roughly as follows: peripheral nerves, 5000; maxillofacial, 300; blind, 250 to 300; ear, 300 to 500; cases for instruction and lip reading, 100. The capacity of Cape May is about 700 beds.

Maxillofacial Surgery. I should like now to speak of two things which have impressed me more than anything else that I have seen during the war in our line and kindred lines, namely, the dental work and the associated plastic work of the face. These two subjects disposed of, the re-

maining part of the paper will consist of a review of the otolaryngologic work in this country, stressing, to use an overworked word, the subject of the prevention of air-borne infections.

In 1915 I served with the British in the First Harvard Unit. In this there was a young Boston denist named Kazanjian. His treatment of fractured jaws was the newest surgery that we had to show the British. He is still working with the British, and I visited him last year and saw his latest work. At the same time I looked in on Valadier at Boulogne, and I also saw the magnificent dental equipment at Neuilly in the outskirts of Paris. At the end of my trip I visited in England, Sidcup, the splendid. The dental surgeons are having in this war the opportunity of a lifetime. At the beginning of the war when I thought of a fracture of the jaw I thought of a fourtail bandage, or of a tin affair of my own invented in the early days of my career, or of drilling and wiring the loose fragments. Interdental splints—the splinting of the upper jaw by locking the lower to it—the restoration of the form and function of the jaw by a vulcanite plate which allows the patient to use his jaw at once and furnishes a surface over which defects in the lip or cheek can be repaired, and the use of bone transplants for large losses of substance, have supplanted the cruder methods of treatment which were in vogue up to four years ago.

It has been learned during the war that the loss of a very large amount of bone from the lower jaw can be replaced by nature. The loss of even as much as an inch at the symphysis will finally be bridged across if the ends of the jaw are immobilized by an interdental splint. In the early days of the war, when the jaw was badly fragmented, the small pieces of bone were usually removed for fear that they would slough. Now, they are left in and in some instances are even suspended in place by various forms of apparatus because it has been found that they generally act as bone grafts and on this account are very precious. The teeth have been used not only to splint fragments of a broken jaw but numerous outriggers have been attached to them and carried up into the vestibule of the nose to maintain

its patency or to support the soft parts above, pending the insertion of bone or cartilage and, finally, the outriggers have been used to take off tension from plastic flaps of the face.

Any otolaryngologist who holds a position in a hospital where there are many extensive traumatic injuries of the jaws and face should put himself in touch with the present status of jaw surgery and the possibilities of the mechanical help that the dentist can give to the surgeon who does plastic work on the nose and face.

THE TRANSPLANTATION OF CARTILAGE AND BONE.—At Epernay, Col. de Schweinitz and I found Majitot implanting sheep's and lambs' cartilage for supports in plastic operations of the face. He keeps a supply in a weak solution of formalin, washing out the formalin before using the cartilage. Gillies at Sidcup we found using human cartilage but storing it in anothr way. He exhibited one patient with six pieces implanted in the fat of the abdominal wall. When he figures that he will need more than one piece of cartilage in a case, he takes his full supply at the first operation and places it in its novel storehouse to remain there until he needs it.

The method of making a whole nose interested me very much—I am now speaking especially of what I saw at Sidcup. The first step is to take a strip of cartilage of the right shape to make the bridge of the nose and bury it under the skin of the forehead. At the upper end of this two smaller pieces are inserted. These are to stiffen the parts of the flap, which are to become the new alæ. In a month or six weeks—Blair thinks that this is unnecessarily long—it is considered that the pieces of cartilage are well established, and a flap with the embedded cartilages is raised and a skin graft folded over a form or stent made of a thin sheet of modeling compound is placed under it, sewed in place and not disturbed for ten days. The graft produces epithelium on the under surface of the flap and over the gap in the skin of the forehead from which the flap has been taken. When the flap is turned down to make the new nose, wherever an attachment to the face is desired the new epithelium is removed. It is left, of course, where the

vestibule of the nose is to come. Having the under surface of the new alæ epidermatized when the new nose is swung into place prevents much shrinking and preserves the patency of the vestibule. This method of using a double skin graft over a stent is Esser's and is not new. Neither is the procedure of burying cartilage and turning down at a later period the flap containing it new, but the war has brought these procedures into very great prominence.

I suggested to Major Ivy that he use the stent method of applying the skin graft in the case of a soldier at the Walter Reed Hopsital, Washington, who had lost the ala of his nose on the right side by a motorcycle accident. The first part of the operation consisted in cutting a flap from the side of the nose and placing a double skin graft under it. At the end of ten days the graft had taken and the flap was turned into place and fixed there. No difficulty was experienced in keeping the patency of the vestibule as is usually the case. This procedure of swinging an epidermatized flap onto the nose should be of the greatest use.

The oral and plastic surgeon more or less runs into the field of the otolaryngologist and the ophthalmologist. If the best work is to be done he should work in constant cooperation with these specialists. For instance, it takes long experience to tell how much to overcorrect in plastic operations upon the lids. In the repair of defects of the nose it is imperative that nasal drainage be maintained so that the accessory sinuses do not become infected. If any of the sinuses have been opened by a war wound and are draining through the skin of the face or forehead they must be given proper intranasal drainage if the repair work on the soft parts is to be kept free from infection. I sympathize with the ambition of the otolaryngologist to do the repair work of the face. There are, however, but a few of our men trained to do the larger work. It is not fair to the soldiers to learn of them if this can be avoided. Col. Blair and the men who have worked with him overseas and who are soon to be back in this country are the proper ones to start and to direct this kind of work. Often these plastic cases need more than one operation. The various operations which will be required should be visualized in

the beginning, and the ideal treatment is to have one competent operator execute them all. These cases should not be hacked at all over the country simply because the soldier is homesick and wants to get near the place where he lives.

Those who are ambitious to do the after the war plastic surgery should get to Sidcup, England, and see the work there. This hospital is on the grounds of an old English manor house which has all the charm that goes with a story book place of this kind, a large lawn, old trees covered with ivy, urns, formal walks and a hothouse for camelias. At the far end of the lawn is the hospital, built in a simple half timbered style, with wards radiating from a central horseshoe corridor. The buildings are painted attractively. The wards are tinted in quiet colors and have good pictures on the walls, and there are many flowers about. The colonies—Canada, Australia and New Zealand—each have a ward staffed by its own medical officers. It was suggested that America come in as the fourth colony. Just think what the politicians of America would say to this! A year ago there was a good beginning of a library of plaster and wax models of cases and methods of operation, and many water color drawings of patients before and after operation. The records in the Canadian section were kept and illustrated by an expert artist. The diagrams, the photographs and even the lettering on the covers of the history blanks were of the highest artistic excellence. It was at this place that I first saw the double skin graft used over modeling compound and grasped the idea of its extended usefulness in the plastic surgery of the face. It was a great temptation to accept the implied invitation of the staff to become temporarily one of their number and to ask the Surgeon General's office for orders which would allow me to settle down in this lovely place, where the very latest advances in plastic operating were being carried out daily.

Otolaryngology in the Base Hospitals in the United States. The Prevailing Bacteria.—In the United States the war from the medical standpoint has been a war with the organism of influenza, the pneumococcus and, above all, with the streptococcus hemolyticus. The following striking figures are taken from Col. E. B. Vedder's prize essay on "Sputum-

borne Diseases."[1] The percentages were collected in 1817, before the epidemic of influenza. When the figures of the epidemic are available they will probably be even more striking.

"Cummings, Spruit and Lynch swabbed 291 measles patients; 104 of these had hemolytic streptococci in their throats, and among these, 51, or 49 per cent, developed complications, including 34 cases of pneumonia and 9 cases of empyema.

"With regard to pneumonia, of the measles patients that harbored nonhemolytic types, 3 per cent developed pneumonia; while among those harboring hemolytic streptococci, 33 per cent developed pneumonia. This indicates that the hemolytic streptococci are to be regarded as the causal organism of most of these cases of measles pneumonia.

"The hemolytic streptococci are also the chief cause of the empyemas which have caused so much trouble during the past year (1917). One hundred and forty-eight cases of empyema were studied at Camp Doniphan. In an examination of the exudates, hemolytic streptococci were found in 137 cases, or 92.5 per cent. Pneumococci were found in 9 cases, or 6.1 per cent, and the streptococcus viridans in 2 cases, or 1.4 per cent.

"Where do these streptococci come from? They undoubtedly come from the mouth and throat. In the course of a survey for meningitis made from January 1 to March 1, 1918, at Camp Doniphan, cultures were taken from the nasopharynx and about 20 per cent of the cultures showed the presence of hemolytic streptococci in normal individuals. Cultures taken from the nasopharynx and tonsils of 38 empyema cases revealed the presence of hemolytic streptococci in 22, or 57.9 per cent. Cole and MacCallum found that a very large number of patients suffering from acute lobar pneumonia have hemolytic streptococci in their throats, and that when the infection is once started in a ward in which the patients are closely associated the streptococci become widely distributed and probably gain in virulence.

"The information that has accumulated from such observations indicates that hemolytic streptococci are fairly common inhabitants of the normal mouth and throat. They probably cause little trouble until for some reason the vitality of the

1. Military Surgeon, February, 1919, p. 123.

patient is reduced as by measles, exposure to cold and other factors. But when the vitality is so reduced they occasion a very fatal form of pneumonia, often associated with pleurisy and empyema.

"Under ordinary conditions, in a barracks, where contact is close, these streptococci are distributed more widely like other sputum borne organisms. The same thing occurs in a crowded ward, and here the liability to the development of pneumonia and empyema is much increased because all the patients in the ward are reduced in vitality. Under these circumstances the disease becomes frequent instead of occasional."

Major Scott and his collaborators in a paper compiled at Fort Riley deal with the causes of mastoiditis. His paragraphs on "locality infection" are striking and are here quoted. They reinforce strongly what has just been said in the last five paragraphs.

"LOCALITY INFECTION.—By the term 'locality infection' is meant the occurrence in a locality or army post of a certain organism which is found to predominate, either singly or combined, in infections occurring in that particular locality or army post. At one camp, for instance, the hemolytic streptococcus may be the organism found in the tonsil crypts, in pneumonia, in mastoiditis or other diseases, while in another camp the pneumococcus, or streptococcus viridans may be the prevailing organism. Any one of these organisms may become virulent for a certain period and then apparently become of little consequence. However, when an epidemic of tonsillitis, measles, scarlet fever or influenza occurs then the particular organism for a certain locality suddenly assumes the rôle of secondary invader and becomes the predominant factor in complications. That the temporary home for this 'locality infection organism' is in the tonsil crypt is undoubtedly true, while the accessory nasal sinuses are at times the home of the organism.

'The spasmodic appearance of a number of cases of acute mastoiditis is not surprising when one considers the above factors as noted in cantonments. During January, February, March, April and May, in 1918, the hemolytic streptococcus was the locality infection at Camp Funston. The number of pneumonias and mastoiditis cases (requiring mastoidectomies)

was so great that one could speak of it as an epidemic. The organism which predominated in both series of cases was the hemolytic streptococcus, occurring in 28.2 per cent of all pneumonia and 76 per cent of the mastoids (cultures from the mastoid cells at time of operation). The term streptococcus epidemic therefore is a better term.

"In the recent epidemic of influenza in the same hospital, tissue cultures at necropsy showed the predominating organism again to be the hemolytic streptococcus. It was present singly or combined in 41.1 per cent of all tissue cultures, including the lung, pleural fluid, heart blood, spleen, nasal sinuses, mastoids and spinal fluid. Blood stream invasion occurred late in this series of cases.

"Following the epidemic of influenza, measles cases began to appear in large numbers, and again pneumonias and mastoiditis. The primary diseases lowered the resistance of the patients, and blood stream invasion by the prevalent organism, hemolytic streptococcus, again occurred, with the resulting complications. In a series of 50 mastoiditis cases beginning in October, 1918, 22 cases were complications of measles. The hemolytic streptococcus was found in 46 per cent of all cases.

"From the above statements one must conclude that the occurrence of mastoiditis as seen in army cantonments depends uppon the surroundings of the individual and the presence of a virulent organism such as the streptococcus or pneumococcus. Further, that the invasion of the mastoid occurs directly from the nasopharynx or the blood stream."

In a series of 123 mastoid cases reported from Camp Shelby, 12 cases died of meningitis. All were caused by the streptococcus group; 7 by the streptococcus viridans and 3 by the streptococus hemolyticus.

Camp Pike reported for December, 1918, a series of 21 operated mastoid cases, in all of which the streptococcus hemolyticus was obtained from the temporal bone. The same organism was found in a temporosphenoidal abscess, a subdural abscess and a thrombus of the lateral sinus, which were complications of these cases.

There is something uncanny about the way certain bacteria remain for a time harmless and then suddenly acquire an

astonishing virulence. We now appreciate that overcrowding, fatigue and chilling of the human body are important factors in bringing about this result; further than this the process is a mystery. When it is solved preventive medicine will take a great leap forward.

THE NOSE AND THROAT AS THE LODGING PLACE FOR BACTERIA.—This war has brought into startling prominence a fact long known but never before so graphically demonstrated, namely, that the throat especially, and the nose and its accessory sinuses to a certain extent, are the primary lodging places of the bacteria responsible for the infectious diseases and those that are sputum borne. The meningococcus dwells in the vault and in adenoid remains, and occasionally in the sinuses; the staphylococcus aureaus, the streptococci (including the notorious hemolytic variety), the pneumococcus, the spirillæ and fusiform bacilli of Vincent's angina, which are responsible for the "trench mouth" and the "trench throat" of the western front and the bacilli of diphtheria, all elect to occupy the crypts of the tonsil and produce acute disease, or dwell there harmlessly, so far as their host is concerned, making him, however, a deadly companion.

CARRIERS.—The detection and the treatment of the carrier has been and still is one of the great problems of the medical department of the army. The army is fully alive to it and deals with it to the limit of the physical endurance of its staff of bacteriologists. Next in importance comes the prevention of droplet infection, through isolation, the use of cubicles and of substantial gauze masks.

DICHLORAMIN-T.—Martin and Furness, at Oglethorpe, obtained very suggestive reports during the influenza epidemic by spraying all his hospital staff with dichloramin-T. and by enforcing the universal use of a substantial gauze mask. It was very significant that those of the personnel in his hospital who contracted influenza, and two did and died, either refused treatment with the spray or contracted the influenza before the routine use of the spray and the mask was instituted. Dunham, the man who freed Bar Harbor of flies and who headed the empyema commission and further added to his fame, devised a gang spray for use with troops. He demonstrated that a thousand men could be sprayed in an hour

and that spraying with dichloramin-T markedly reduced the bacterial flora of the nose and throat. The armistice put an end to his work. It seems a heartless thing to say, but from the medical standpoint the war came to an end too soon.

In the extended study made in the camps it was found that nurses and orderlies were often carriers. This would seem to show that when we go back to civil life it would be a good plan to regularly culture the nose and throat of all the hospital personnel, including even the physicians. It would be worth while also to spray with dichloramin the nose and throat of every patient who comes into a hospital.

All the knowledge and half knowledge which has come out in this war should be proved in our civil hospitals. For example, carriers should be eliminated from the hospital personnel; every patient should be proved not to be a carrier before operation; every case of tonsillitis should be isolated by putting it in a separate room, by placing it in a cubicle or by the use of a mask. Infectious cases and septic cases should have separate wards. When possible different members of the staff should operate pus cases and clean cases. There should be insistence on the use of a clean operating room, and a pus room. In our best hospitals many of these procedures are carried out as a matter of routine. I happen to know of none where the carrier problem is recognized or in which sufficiently energetic measures are taken with tonsillitis.

It will be interesting to see how long the streptococcus hemolyticus retains its present virulence after all the army hospitals are closed and there is no more assembling of large bodies of men in cantonments.

From what has just been said it is easy to see how the otolaryngologists must have played a prominent part in this war. The section of otolaryngology was at first the busiest of all the surgical sections and at one time did 27.5 per cent of all the operating. Its work is still abundant in certain places.

From the nature of things, only necessary operations are performed in the surgery of the army. The stock operations in the section of otolaryngology therefore have been myringotomy, mastoidectomy, submucous section of the septum, tonsillectomy, and the incision and drainage of peritonsillar abscesses.

The returns are not all in, so that the following table of operations is only approximate:

TABLE OF OPERATIONS.

Mastoidectomy (simple)	2,175
Mastoidectomy (complete exenteration or radical), 3.6 per cent	72
Meningitis (complicating mastoid disease), deaths	22
Brain abscess (number of cases)	15
Tonsillectomy	11,646
Tonsillectomy and adenoidectomy	2,396
Adenoidectomy	584
Submucous resection	3,246
Peritonsillar abscess	1,199

There were 14,042 cases of tonsillectomy with 4 deaths; 2 presumably from cocain, 1 from embolism which occurred under anesthesia and 1 from tonsillar hemorrhage.

The number of peritonsillar abscesses has been very striking. Camp Devens reported 50 in a month, and Col. McKernon states that overseas one medical officer opened 24 in a week. As the total number which has occurred in the army in the United States is 1,199, there is good ground for saying that at least 1,000 more tonsil operations could have been performed with benefit. The majority of the tonsillectomies have been done under novocain, procain or aposthesin, and all the patients, of course, have been adults. I consider it remarkable that so far only one death from tonsillar hemorrhage has been reported.

Thrombosis of the lateral sinus has not been very common. Three hemorrhages from the lateral sinus have been reported, caused by spontaneous rupture of the sinus, four or five days after its exposure in a mastoid operation. The monthly reports bring out the fact that the mastoiditis following measles took a fulminating course and was characterized by early, painless and severe destruction of the cellular structure of the mastoid process. More than one observer has felt that the involvement of the mastoid was often a part of a general blood stream infection.

Holmes reported the cure of 16 diphtheria carriers by the

removal of the tonsils and the adenoids and one cured by a Killian operation. He reported also 11 cases in which nonvirulent diphtheria bacilli were found mixed with streptococci and pneumococci in the aural discharge of acute otitis media. Friedberg also reoprted a series of cases of chronic diphtheria carriers cured by operation. The above list gives the standard army operations.

Operations for the replacement of fracture of the nose, usually from mule kicks, the removal of nasal polypi and drainage of the antrum are next in frequency. A few instances of nearly all the standard operations of otolaryngology are presented in the reports from the camps. In the early days there were two foreign bodies in the trachea: a dental brooch and a peanut; these were sent to Philadelphia to Dr. Jackson. A short time ago, at Oglethorpe, a quarter was removed from the upper end of the esophagus. Tracheotomy has been done a few times for edema of the larynx, probably caused by deep infection.

The following tabulation gives an idea of the amount of work done in one of the most active base hospitals, namely, Camp Sherman:

Number of new cases treated in the ear, nose and throat department	7,210
Number of operations performed in the ear, nose and throat department	2,227
Number of treatments given in the ear, nose and throat department	35,261
Number of deaths	10

At times rather too many secondary mastoid operations were necessary. In one series of 158 mastoid operations, 28 reoperations were reported and 8 cases of facial paralysis, 6 of which were permanent. This is not a good record. Speaking of the character of the work, I said in a previous paper that, on the whole, it has been good; that it has fallen down in certain places—by this I mean that there were too many cases of facial paralysis in operations for acute mastoiditis, too many cases of reoperation, and at times, in a few places, that there was a suspicion of overoperating—is due to the fact that the otolaryngologists of the country who had the

training to make the work better did not come into the service in sufficient numbers to go round.

Leaving this very brief tabulation of operations and turning to the diseases with which the otolaryngologist has to deal, the reports from the camps show that there has been very little diphtheria. Almost no erysipelas has been reported in connection with mastoid operations in spite of the fact that the streptococcus has been the reigning organism.

NEW CLINICAL OBSERVATIONS.—A number of new things have been picked up by the otolaryngologists in the cantonments. Major F. D. Owsley described a series of cases of ulcerative laryngitis due to the pneumococcus. He saw the cases at Camp Travis and labeled the process a new camp disease. It is distinguished by a superficial ulceration of the anterior ends of the vocal cords. The chief symptoms are hoarseness and aphonia. All of the cases responded readily to treatment with solutions of silver. Major Wells P. Eagleton at Camp Dix successfully placed a bone graft from the tibia in the cavity of the mastoid process produced by a simple mastoid operation. Major Eagleton feels that he has a new frontal sinus operation, and Major Fetterolf has confessed to a new procedure for the resection of the nasal septum. Undoubtedly, both of these operations will be reported later. At one of the base hospitals there was a run of cases of hysterical aphonia, "Whispering Willies," as they were called. They were turned over to the psychiatrist who had great success in curing them.

When I was in France a year ago I heard that Robertson had autopsied a number of cases of influenza which showed pus in the sphenoid sinus, the other accessory sinuses being free. Major J. H. Bryan, while serving at Walter Reed Hospital, Washington, went through a streptococcus epidemic, and the autopsies gave a similar finding. In addition, in one case there was an odd involvement of the epiglottis and of the larynx. In this war, therefore, the sphenoid sinus has come more and more under suspicion. Eagleton was on the watch to duplicate these findings, but in the autopsies which occurred at Dix the sphenoid sinus was not involved.

Holmes at Sheridan and Harris at Oglethorpe have drawn attention again to the manifested advantage of the use of gas

oxygen for producing the anesthesia for mastoid operations in pneumonia cases. Two other medical officers, Porter and Orton, have reported a series of similar cases which they operated under local anesthesia.

A report from Camp Zachary Taylor for the month of January, 1918, gives an account of 39 mastoid operations, 5 of the cases being bilateral. Bilateral operations were not so very rare.

Hill, in a study of the aural complications of the recent influenza epidemic at Fort Oglethorpe, came to the conclusion that in mastoid cases a drooping posterior, superior canal wall did not indicate a suppurative mastoiditis. He still has faith in the other classical signs, namely, increased purulent discharge, thickened periosteum, mastoid tenderness and edema. Major Scott, of Fort Riley, considers that in mastoiditis the chief indication for operation is bone necrosis as shown by the X-ray. The X-ray plates which he was able to obtain were unusually clear and so enabled him to place great reliance upon them.

The Carrel-Dakin solution, which has figured so largely in the treatment of empyema, naturally has been tried also in the treatment of mastoid wounds. Eagleton feels that the solution gives a cleaner wound and hastens the healing. Scott advocates a dressing of chloramin paste for mastoid cavities. Dakin's solution has been used with good results at Cape May in clearing up cases of chronic running ear.

THE INFLUENZA EPIDEMIC.—The influenza epidemic, which reached the proportions of a plague or as near a plague as this generation of physicians has ever seen, spent its virulence upon the lungs.

The following account of the epidemic from the otolaryngological point of view is from Shambaugh and duplicates the reports sent in from most of the base hospitals.

"About September 21, 1918, an epidemic (influenza) broke out in Camp Grant. The number of patients in the hospital increased from normal 500 to 3,600, with a daily admission rate running up to 800. The consultation work of this department was enormous. There were over 600 cases observed with otitis media acuta suppurativa. In most cases there was

a spontaneous rupture of the membrana tympani within a few hours of the onset of ear symptoms. The discharge, as a rule, appeared thick and purulent from the onset, and did not have the initial stage of serosanguinous discharge so frequently met with in the ordinary case of acute otitis media. Many of these cases were complicated by a diffuse otitis externa and very few showed any mastoid reaction. Most of the cases recovered rapidly—that is, in about a week.

"There were, realtively a small number of cases which showed distinct symptoms of acute sinusitis. Most of the sinus cases proceeded to spontaneous recovery. It seems probable that not a few cases of acute sinus infection passed undiagnosed. Not a single case of sinus trouble required operation.

"Epistaxis was a very frequent complication. The bleeding in these cases did not become serious and no special treatment was instituted to stop the bleeding.

"Cultures were made from but a few of the cases. In three cases in which cultures were procured immediately following the paracentesis all showed a pure culture of pneumococcus. In the cases in which cultures were procured from pus washed from the maxillary sinus both showed pure cultures of pneumococcus. Cultures were made from the pus found in opening the mastoid in six cases. Four of these showed pure hemolytic streptococcus and one showed a pure culture of pneumococus."

The initial epistaxis was a striking feature. Green found that it almost always came from a single vessel located at the customary bleeding point—the mucous membrane over the anterior inferior part of the quadrangular cartilage, but Buff found that it came from the turbinates.

Emerson had the distinction of being made commanding officer of a special influenza hospital of 1,500 beds at Camp Lee, and made a striking success of it.

Eagleton experimented with suction for removing the secretion from the trachea of pneumonia patients just after death, his idea being to use it in the living if he obtained results. He found that the secretion was too thick to respond to suction.

The tragedy of the epidemic still awaits a full description. Patients were struck down with the suddenness of lightning. To say that the morgues of the hospitals were overflowing with dead sounds commonplace, because we have heard it said so often. It was, however, literally true. In the camps military funerals were taking place all day long and the hospital flag stayed at half mast throughout the epidemic. At the railroad stations the coffins which were being slowly wheeled along or lay about waiting for a place in the baggage cars kept the scourge before the eyes of every traveler.

I remember the impression that the blue patients made on me as I went about the crowded wards at Oglethorpe. The virulence of the disease struck me like a blow when the medical officer who accompanied me said: "This man will be dead tomorrow, that one the day after," and none of the patients seemed to me so desperately ill. The fathers and mothers, the wives and brothers and sisters sitting by the bedsides, singly or in groups, added to the tragedy and to the general hopelessness.

Only a few doctors died, but enough to show that they were not immune. At least two wives of doctors who either lived in the camp with their husbands or came to visit were victims. One very sad case of this kind occurred at Oglethorpe. The wife of the pathologist died the day before I arrived. After talking it over with his commanding officer he decided to remain at his post and carry on his work in the autopsy room, assembling material while it was still available for scientific purposes. On the day of his wife's funeral one of the visiting physicians happened to be in the morgue at noon and found him crowded with work. The physician asked if he could be of any help. The answer was: "It would help if you could stay a little. At this hour in New York my wife is being buried. That was lonely devotion to duty which words of mine cannot adequately appraise.

Leaving the service after nearly two years devoted to it has proved to be a tender time for me. The following lines express a little of the feeling that comes with it. I take the liberty of reading them here and at the end of my paper, because I have found myself very close to some of the men in the service who now sit before me:

MY SERVICE FLAG.

Today is the day that my flag comes down,
Today marks a duty done.
Tomorrow again familiar paths
Before my footsteps run.

The loving hands that hung my flag
Have been spared to take it down,
And tears that were shed in secret then
Again her eyelids crown.

My reward I find in the eyes I love,
In the mem'ries to which I've been true,
In the comradeship of kindred souls—
And my own soul born anew.

WASHINGTON, April 1, 1919. H. P. M.

SUMMARY.—In the beginning of the war the section of otolaryngology was the busiest of all the surgical specialties. At the present time it remains moderately active, but the section of plastic and oral surgery, now called maxillofacial surgery, and the section of neurological surgery now receive from overseas more of their special cases than the section of otolaryngology. The section of neurological surgery is receiving by far the most cases, the majority of them being injuries of the peripheral nerves.

In the United States the two great medical problems of the war have been the control of sputum borne diseases and the detection and cure of the carrier. The bacteria responsible for sputum borne diseases gain their entrance to the body in most instances through the tonsils or the accessory sinuses. Experience has shown that the best method of curing a carrier is to remove the tonsils and the adenoid. The war has shown also the supreme importance of accepting in the army only recruits who have a normal nose and throat.

The war has shown further the importance not only of discovering carriers, but of segregating contacts. It has brought out the significant fact that the hospital personnel often act as carriers. In dealing with air or sputum borne diseases the great value of isolation and the use of substantial gauze masks has been proved. The probable efficiency of the routine spraying of the nose and throat with dichloramin-T has been shown. More experimentation, however, is needed to

prove this point. The opinion now prevails that every recruit and every hospital patient should be looked upon as a possible carrier.

In the United States the dominant bacteria have been the pneumococcus and the streptococcus hemolyticus, the latter being by far the more important. The following fact has become more and more evident, namely, that assembling men in barracks, exposing them to cold, and drilling them to the point of overfatigue has the power to change harmless bacteria into virulent strains.

In head surgery America's greatest contribution has been in the surgery of the jaw. Bridge splinting, the use of bone grafts, the implantation of cartilage to give form to plastic flaps, and the use of the skin graft folded over a plate of modeling compound have greatly advanced maxillofacial surgery.

The fact that so many tonsillectomies were performed with so few deaths from any cause, and only one death from tonsillar hemorrhage speaks well for the skill of the operators and the type of operation employed. The striking number of peritonsillar abscesses would seem to show that even a larger number or tonsillectomies could have been performed with advantage.

The influenza epidemic was a dramatic and deadly scourge, but the complications produced in the line of otolaryngology were not serious. It emphasized the fact, however, that a normal nose and throat is a great protection.

The otolaryngologists have faithfully and enthusiastically used their specialty for the prevention of disease as well as its alleviation. Their first aim was preventive surgery, and they largely realized it.

In looking backward over our war experience things are seen which could have been done better. The following are some of them. Recording them may help another time, if there ever is another time:

The draft examination should have been more thorough. Too many cases of chronic running were overlooked.

There could have been closer cooperation between the camp and the base hospital. There was no provision for an automatic interchange of special personnel.

Special instruments and supplies were late in getting to the hospitals.

Instruments, medical supplies and literature were late in getting overseas.

The hospitals at the port of embarkation should be thoroughly equipped and staffed. Soldiers destined for overseas often arrive at the port of embarkation seriously ill.

In the United States the power to act as consultant should have been given to the chiefs of the sections earlier.

Each medical and surgical section should have a medical officer to act regularly as courier between the home base and the base of operations.

XXXI.

DELAYED SECONDARY HEMORRHAGE COMPLICATING TONSILLECTOMY.*

By Virginius Dabney, M. D.,

Washington.

As long as the operation of tonsillectomy is performed, whatever be the method, just so long must the hemorrhage, immediate or remote, accompanying the procedure be a matter of prime importance to the conscientious laryngologist. Where a slow severance of the tonsil base is secured and all hemorrhage controlled before the patient is taken out of the operating room, it is my belief that a true secondary hemorrhage is comparatively rare, especially if the number of those who escape this unfortunate complication be compared with those who do bleed secondarily. Certainly a hemorrhage ten days after operation is rare indeed, and one such I will report in this paper.

During the past twelve years I have had under my care only four cases of secondary hemorrhage delayed beyond twenty-four hours after operation for removal of the faucial tonsils. Of this number the first two were done under cocain infiltration, without adrenalin, with the Mackenzie tonsillotome; the last two under ether and with the cold snare. One of these cases came under my care after operation by another laryngologist in a neighboring city.

Case 1.—Some twelve years ago I was called upon to remove the tonsils of a vigorous country girl of eighteen years who had had many peritonsillar abscesses with the usual inflammatory adhesions and fibrous tissue formation as a result. She gave no history of excessive bleeding nor did the dissection of the tonsils result in any unusual amount of blood loss. The operation was done under 5/10 per cent cocain (no adrenalin), using a Mackenzie tonsillotome, and the patient went home in two hours and was put to bed. Two days later I had to stop a very free general capillary hemorrhage from the entire posterior pillar of one side by the use of ice placed

*Read before the American Laryngological Association, June 17, 1919.

and held firmly in the fossa. This procedure in the course of a half hour caused permanent cessation of the flow. There had been no hemorrhage between this time and the day of operation, nor did there appear to be any loss of the clotting power at this time. The pillars showed no injury.

Case 2.—A few months later I removed the tonsils of a man of twenty-five years in good health and of splendid courage under pain, using the same technic as in the first case, but here there was free bleeding during the operation and a secondary hemorrhage six hours later that gave me much concern till it was controlled. Ten days later this patient fell in the street from weakness resulting from a profuse hemorrhage which began as he was walking quietly and did not stop till he fell, as stated. There seemed a certain amount of deficiency in the clotting power of the blood throughout this case. but no injury to the pillars was apparent.

Case 3.—In this case the cause of the hemorrhage was ultimately quite plain, though the delay in its appearance is yet obscure. His tonsils had been removed a week before, and his history as given to me by him was, in brief, that he had been in the operating room nearly two hours owing to difficulty in arresting the flow of blood. He remained in the hospital after the operation five days and had no trouble while there. Two days after returning to Washington he was wakened by a sensation of strangling and found his mouth full of blood. I found his throat so rebellious and the flow of blood so persistent and profuse that a careful examination was impossible. As he was living in the suburbs and I had no assistance, I tried local applications which included ice, silver nitrate, glycerite of tannin and pressure with gauze sponges, all of which seemed to control the flow for a few minutes at a time. However, after six hours of this procedure I brought him to the hospital, anesthetized him with great difficulty, as he was vomiting freely much blood all the time, and in a few moments found the bleeding point, a jagged tear in the middle third of the posterior pillar, such as could have been made by a punch or the end of a sponge forceps. This is mere conjecture, of course, as I was not present at the operation. Clamping the pillar soon stopped the hemorrhage. This patient had an arrested tubercular kidney and hip.

Case 4. The small buried tonsils in this young girl of nineteen years were dissected bluntly and snared away with little loss of blood except in one place, which required a clamp for a few moments. The tonsils had been partially removed some years before, and there was the usual scar tissue, of course, rendering the dissection slow and trying. The operation was done under ether with the snare, and the patient had no complications during her three days' stay in the hospital. Three days after this, six days after the operation, I found a clot the size of a hazelnut in one fossa and a thin stream of blood trickling down behind it. She reported that her throat had been bleeding two hours before she called me. I removed the clot and packed the fossa with a soft gauze sponge, which I removed in twenty-four hours, during which period there had been no loss of blood. However, in a few moments after removing the packing it began again, necessitating a repacking, which ended the trouble permanently. Her history threw no light on the trouble, as she had never had any severe hemorrhages and was an excellent physical specimen. Her father had had pulmonary tuberculosis, but the process had been arrested for several years.

It is my belief that the cause of these secondary extravasations when thus delayed cannot be definitely stated, but it seems reasonable to assume that in some instances the explanation may lie in the separation of a slough, which forms in all cases to some extent, especially where there has been much trauma. Where this slough involves vessels its separation might readily cause some hemorrhage. Again, exertion resulting in increased force in the blood stream against the walls of small vessels thinned at operation, might cause the flow of blood through rupture of the thinned areas. A tuberculous or syphilitic taint would enhance this possibility, of course.

The further I travel along the road of laryngology the more sensitive I become to tonsillar hemorrhage, the greater becomes my respect for bleeding areas in the denuded fossæ. This confession bespeaks, I hope, rather caution than timidity, and that wisdom which is said to come with age. I hope I am the safer man thereby; certainly the patient is.

1633 Connecticut Avenue.

XXXII.

THE OTOLOGIC WORK IN THE U. S. A. GENERAL HOSPITAL FOR HEAD SURGERY.

By J. M. Ingersoll, Lieut.-Col., M. C.,

Cleveland.

In January, 1918, the Medical Department of the army leased a modern fireproof hotel at Cape May, N. J., and converted it into a Hospital for Head Surgery, known in the army as the U. S. A. General Hospital, No. 11.

The building was renovated and the necessary equipment was sent to the hospital as rapidly as the Medical Department could secure it. At first the equipment was quite limited, but gradually it was augmented and at the end of a few months was reasonably complete.

The work in the hospital was divided into the Ophthalmologic Section, the Oroplastic Section, the Otolaryngologic Section, and the Section for Brain Surgery, and later Peripheral Nerve Injuries were added to this department.

Associated with me in the Otolaryngologic Section were the following men: Capt. Gordon Berry, Capt. H. F. Lampe, First Lieut. F. N. Bigelow, First Lieut. E. P. Longaker, First Lieut. H. J. Beard. Capt. H. P. Cahill was also a member of the otolaryngologic staff until August 10th, when he was assigned to Unit 115, and went to France. These men are all well trained and earnest workers, and our association in the work was most pleasant.

The work in the various sections overlapped, so that the majority of all of the cases in the hospital were seen in consultation by two or more departments, and the whole hospital staff worked together as one unit. This hearty cooperation and teamwork added much to the efficiency and pleasure of the work.

The first patients received in the Otolaryngologic Section were twenty-six ear cases, transferred from the General Hos-

pital, No. 2, on April 1, 1918. The first patients from overseas were received on July 1, 1918. Among these first overseas patients there was a case of bilateral concussion deafness. This patient was a Lieutenant, who took part in the first attack which the Americans made against the Huns on the Lorraine front in November, 1917. In the advance he was knocked down and stunned by a high explosive shell, but got up almost immediately and went on with his men. A little later a second shell exploded so close to him that he was rendered unconscious by the explosion, and he was picked up and carried back to the First Aid Station. On recovering consciousness he was totally deaf in both ears, and was returned to this country on account of the deafness. In the attack eleven of his men were captured, and he supposed that they had been killed, but a few weeks later he saw the picture of six of his men in a German paper. This picture was later published in this country with the legend that these were the first Americans captured by the Huns. He supposed that the other five men had been killed, but later learned that they had been wounded and were in a hospital when the picture was taken.

A second man in this first group of overseas patients had a facial paralysis, with complete deafness in the left ear due to a fracture of the skull. This man, also an officer, had been thrown from his horse in some practice work, and his skull was fractured in the accident. These two ear patients were the first overseas patients received in the Otolaryngologic Department.

Among the patients received later, there were three more cases of deafness due to fracture of the skull, from accidental injuries. One man was sleeping on a haymow, and while walking in his sleep fell about fifteen feet, striking on his head and causing a fracture at the base, followed by deafness in the right ear.

Another man was driving a truck at night, and in crossing a bridge the truck went over the side of the bridge into the river. The driver of a second truck, following closely in the rear, heard the crash, stopped his truck and sprang into the river to rescue the first man, who was struggling frantically and nearly drowned when the second man reached him. The drowning man grasped his rescuer, and both were sinking

when the second man seized a piece of floating wood and struck his companion over the head, rendering him unconscious. He then swam to the shore, dragging the unconscious man with him. The blow over the head in this case produced a fracture at the base on the left side and an infection in the left ear. This infection, fortunately, did not involve the meninges, and the man recovered. The deafness in the ear, however, was permanent.

In the third case, the soldier came into the messroom while intoxicated and attacked the mess sergeant, who in self defense grabbed a piece of firewood and struck his assailant over the head, producing a bilateral fracture at the base, with deafness in both ears.

Another ear patient, named W., received in one of the groups of men coming in later, was on the Ticonderoga, eight days out from New York, when she was torpedoed and sunk by a Hun U boat. She was a merchant ship with very limited berth capacity, and for this reason there were only about one hundred and twenty soldiers on board. Her crew consisted of sixty men. Only twenty-one of the total number escaped. The first shot from the U boat struck the Ticonderoga in the bow and the forward gun was put out of commission, and all of the gun crew were killed. When W. came on deck he discovered that the shells were coming over about four feet above the level of the deck, so he dropped on his hands and knees and began to crawl aft. While in this position a shell struck immediately under him, causing concussion deafness in the right ear. The ship was set on fire by one of the shells, and as the U boat had disappeared the pumps were started and the fire extinguished. The U boat soon returned and shelled them again, and fired two torpedoes. Both of them hit and the boat began to sink. He was assigned to one of the lifeboats, and with eighteen others succeeded in launching it and getting aboard. After the Ticonderoga had sunk, the U boat then shelled the lifeboat, but did not hit it, and a little later came up alongside and asked if the captain or any other officers were in the boat. Although three officers were with them they were not recognized, as they did not have their uniforms on, and the men in the boat denied having any officers present. The U boat then abandoned them in midocean. Two other

men were picked up in the water, and they all drifted for four days and three nights. During this time two men, who had been wounded, died and were buried at sea. The survivors were then picked up by an English vessel bound for America, and two days later transferred to an American transport which landed them in New York.

The total number of otologic patients which we received from overseas from July 1, 1918, to March 1, 1919, was two hundred and eighty-three:

Thirteen cases of wounds in the mastoid region.

Two cases of wounds of the auricle only.

Fourteen cases of otitis media suppurative acute.

Three cases of otitis media catarrhal acute.

One hundred and forty-one cases of otitis media suppurative chronic.

Fifty-five cases of otitis media catarrhal chronic.

Thirty cases of otitis interna, due to concussion.

Two cases of otitis interna following meningitis.

Twenty-three cases of mastoiditis.

The wounds around the mastoid region were caused by pieces of high explosive shell or shrapnel or hand grenades or bullets. The size of the pieces of shell varied greatly. Many of them were small pieces imbedded in the soft tissue and the bony structures also. Some pieces were about a centimeter square. The largest piece which we saw was ten centimeters long, irregularly rectangular in shape and about one centimeter in diameter. This piece struck the soldier about the middle of the mastoid, penetrated the mastoid and middle ear and stopped at the articulation of the jaw. This piece was, of course, immediately removed at the casualty clearing station, tied up in a piece of gauze and sent along with the patient, as he, like all other men who were injured, wanted to keep the piece which hit them.

When he arrived at No. 11 there was a depressed scar over the right mastoid, with some unhealthy granulation tissue in the depression. There was also a facial paralysis on the right side, and the auditory canal was almost completely closed by scar tissue, so that it was impossible to secure any view in the canal. The hearing in this ear was destroyed. The labyrinthine reactions in both ears were nearly normal. Captain

Berry operated upon this man, and found that nearly all of the mastoid cells had been destroyed, but the sinus, fortunately, had not been injured. The posterior canal wall had been crushed and pushed forward, and the facial canal, below the horizontal semicircular, had been partly uncovered by the injury. The stapes was in its normal position, but the other ossicles had been destroyed. The pieces of fractured bone were all removed, and the unhealthy granulation tissue. A plastic operation was done on the membranous canal to relieve the constriction, and the wound was closed, the same as in a radical mastoid operation. The facial paralysis improved considerably following the operation, and the mastoid cavity healed quickly.

In practically all of the cases which were wounded in the mastoid region the shell fragments penetrated the mastoid, destroying more or less completley the external auditory canal and injuring the facial nerve. All of these cases were deaf in the injured ear, due either to partial destruction of the cochlea or to concussion. Most of these cases of facial paralysis recovered almost completely when the foreign body and the splinters of fractured bone were removed, thus relieving the compression and irritation of the facial nerve. In all cases of facial paralysis the paralysis was treated with electricity and massage, and in our judgment this treatment hastened the recovery. In all of these cases we did what amounted to a radical mastoid operation, to enable us to remove the foreign body and reestablish the auditory canal.

We had two cases of gunshot wounds of the auricle only, with synechia, causing occlusion of the auditory canal. These conditions were rectified by plastic operations on the auricle and the canal. In both of these cases the hearing in the injured ear was nearly normal.

Most of the cases of injury of the ear and mastoid region were due to primary wounds in this region. We had, however, a few cases in which a machine gun bullet entered some other part of the head and went out through the mastoid. One man was struck by a machine gun bullet which entered the nose at the junction of the right ala with the cheek, passed through both nasal fossæ, the articulation of the left jaw and out through the left auditory canal and mastoid. This injury

caused synechia in both nasal fossæ, deafness in the left ear, left sided facial paralysis and an infection in the articulation of the jaw. When he was admitted to No. 11, the abscess at the angle of the jaw was discharging through the auditory canal. All of these conditions improved very materially under appropriate operative treatment, except the deafness, which remained stationary.

About two-thirds of the one hundred and forty-one cases of otitis media suppurative chronic existed prior to military service. These ears were either not discharging when the men enlisted, or the amount of discharge was so slight that the men themselves considered them healed and said that their ears were normal. The unavoidable exposure accompanying life in the trenches almost invariably caused reinfection in these damaged ears, and as soon as the chronic discharge was discovered the men were returned to this country. Many of them did some good work over there before they reported at sick call and were sent back. One-third of the chronic suppurative cases developed in line of duty, following exposure in the camps or trenches.

We used various methods of treatment for the chronic suppurative cases. The method which gave us the best results consisted in carefully cleaning the ear with little pledgets of cotton and then applying, on a pledget of cotton, one or two per cent oily solution of dichloramin-T. Treated in this way the suppuration in the ears, in most of these cases, ceased and the hearing improved.

There were thirty cases of bilateral deafness, due to concussion from exploding shells. In some of these cases the drum membranes were ruptured by the concussion, but in many of them there was, at least, no evidence and no history of ruptured membranes. The few cases which were not rendered unconscious by the concussion described it as a tremendous explosion, with the sensation of being struck by some flying object. In these cases the labyrinthine reactions were all diminished but not absolutely destroyed, and the deafness, which was complete immediately after the concussion, almost invariably improved somewhat, so that the men could hear a loud voice from one to two feet and were able to hear their own voice and modulate it, and avoid the monotone

which is present in congenital deafness. Two cases of deafness following meningitis showed no improvement in hearing while they were under our observation.

We had one case of meningitis of otitic origin develop in the hospital. This man had had a chronic suppuration in both ears for about twenty years, and showed signs of meningeal irritation soon after he was admitted to the hospital. The symptoms seemed to indicate that the infection originated in the right ear, and I did a radical mastoid on the right side. Following the operation the symptoms of meningitis improved for several days and then became more pronounced, and I operated a second time, exposed the dura, and carefully searched for the channel of infection but could not find it. The patient died a few days later, and the autopsy revealed a basilar meningitis, which the pathologist said had existed for some time. It was quiescent when he entered the hospital, but evidently became active while he was under our observation. At the autopsy it was impossible to tell which ear had been the source of the infection.

We also had one case of sinus thrombosis, secondary to an acute infection in the ear. This case was operated, the sinus ligated and opened, and the patient recovered.

We had eleven cases of acute mastoiditis and twelve cases of chronic mastoiditis, due to chronic suppuration in the ear, which we operated upon. Excluding the cases in which we operated, on account of foreign bodies and injuries of the mastoid, and the plastic operations, the number of mastoid operations was comparatively small.

The major plastic operations in our department were done by either Lt.-Col. V. P. Blair, who was at the head of all of the oroplastic surgery in this country, or under his direction by our staff. We all admired his skill and ingenuity in correcting the deformities of the auricle and surrounding parts, and enjoyed immensely our work with him. In a few cases in which there was no available tissue for plastic work a prosthesis was made by an artist who was one of the hospital staff. All of the patients preferred to have a plastic operation, if possible, rather than be fitted with any artificial device.

We had only two cases of hysterical deafness, both of which recovered. In each case we decided that the deafness

was hysterical by talking to the patient in a low voice while we were conducting the rotation tests. Rather naturally, their attention was so diverted by the turning test that they forgot about their deafness and the hysterical element was evident.

The total number of cases of bilateral deafness in the American Expeditionary Forces, up to March 1, 1919, was one hundred and six, and they were all sent to Hospital No. 11. About thirty per cent were cases of concussion deafness from shell explosions. Two per cent were due to cerebrospinal meningitis. The remaining sixty-eight per cent were due to chronic bilateral suppuration. All of the deaf patients were given instruction in lip reading.

The Section of Defects of Hearing and Speech was under the direction of Col. Charles W. Richardson, of Washington, and he secured for this work eleven of the most capable lip reading teachers that could be found in this country. These women, like most of the men who went into the service from civil life, made decided sacrifices to enter the service, and their skill and loyal work deserves the highest commendation. Each man received individual instruction, beginning with a period of forty-five minutes daily, and then increasing the periods so that each man met his teacher two or three times a day. Under this system of concentrated teaching, the majority of these men made wonderful progress, and in from six to eight weeks many of them became very expert lip readers, so that in conversing with them one scarcely realized that they were deaf. A few of them became so expert that they could read the lips in the moonlight. These deaf patients were invariably very much depressed when they entered the hospital, but as they became able to read the lips their whole attitude changed. They would begin to associate with their companions and join in the games, and they realized that their deafness was much less of a handicap than they had at first considered it to be. Instead of being dejected and more or less morose they became practically normal individuals, and it was a constant source of pleasure to see these men develop.

One of these lip reading patients was a captain, who had been in the regular army for about fifteen years, and his ideas about the war were interesting to me. One day, just after the armistice had been signed, I said to him: "Well, Captain, I

suppose you are glad that the war is over," and he replied, "Yes, but it was a hell of a fine war while it lasted." Most of us do not agree with him.

All of our work at the Hospital for Head Surgery was interesting. The unusual character of much of the work and the hearty spirit of cooperation in all of the departments made the work a source of pleasure and profit for all of the staff.

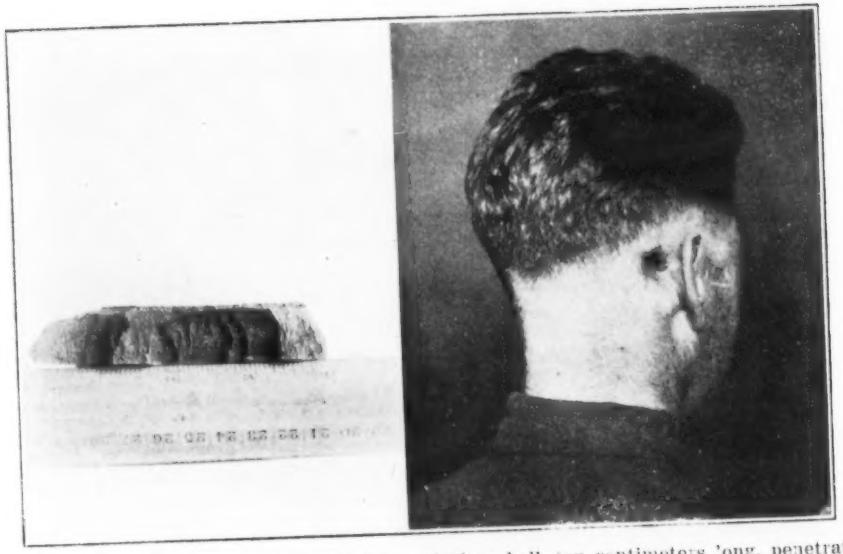
Summary: The U. S. A. General Hospital for Head Surgery received its first patients on April 1, 1918. The first patients from overseas were received on July 1, 1918. The total number of overseas otologic patients received between July 1, 1918, and March 1, 1919, was two hundred and eighty-three, divided as follows: Thirteen cases of wounds in the mastoid region; two cases of wounds of the auricle only; fourteen cases of otitis media suppurative acute; three cases of otitis catarrhal acute; one hundred and forty-one cases of otitis media suppurative chronic; fifty-five cases of otitis media catarrhal chronic; thirty cases of otitis interna, due to concussion; two cases of otitis interna following meningitis.

Two-thirds of the cases of otitis media suppurative chronic existed prior to military service; one-third of the chronic suppurative cases developed in line of duty. The total number of cases of bilateral deafness was one hundred and six. Thirty per cent of these were cases of concussion deafness. All of the deaf patients were given instruction in lip reading. Excluding the operative work on account of foreign bodies, injuries of the mastoid and plastic operations, there were eleven cases of acute mastoiditis and twelve cases of chronic mastoiditis which were operated upon.

This soldier was in a dugout with twelve other men when a shell struck the dugout and set fire to rockets and other inflammable material stored in the dugout. He was the only man who escaped alive. Both ears and his face were badly burned, and also his hands and legs. It was impossible to do a plastic operation for him, as practically the whole face was involved in the scar tissue. With careful massage and gentle manipulation much of the contraction in the scar tissue was relieved. Fortunately, his eyes escaped injury and his hearing was not affected. A prosthesis to cover the defect in each ear was made for him.

At Soissons during an air raid, a machine gun bullet entered the right cheek at the junction of the nasal ala, passed through the right nasal fossa, septum, left fossa, articulation of the left jaw, left auditory canal, middle ear, and out through the tip of the left mastoid. Facial paralysis, which was complete at the time of the injury, gradually improved. When admitted to No. 11 there was very limited motion of the lower jaw, on account of involvement of the joint. An abscess just below the angle of the jaw was discharging through the auditory canal. The abscess was opened and drained externally and the communication with the auditory canal closed. Several bony sequestra were removed from the canal. A plastic operation to restore the normal lumen of the canal and elevate and free the auricle was done by Captain Gordon Berry.

Verdun Sector. A piece of high explosive shell penetrated the right mastoid and middle ear. The injury was followed by facial paralysis, infection in the middle ear and mastoid, and adhesions between the posterior portion of the auricle and the mastoid. The hearing in the ear was completely destroyed. The labyrinth was partially destroyed, but reacted slightly to the rotation tests. A modified radical operation showed that the foreign body had crushed the canal wall and impacted a fragment of bone in the wall of the promontory, cavering the stapes. It had also uncovered the facial canal. This impacted fragment appeared to be healthy and well nourished in its new position and so it was left untouched. Adhesions between the ear and the mastoid were removed and a flap turned in to bring the ear into normal position. The facial paralysis recovered almost completely after the operation.



Chateau Thierry. A piece of high explosive shell, ten centimeters long, penetrated through the mastoid to the articulation of the jaw. The injury was followed by facial paralysis and an infection in the mastoid and middle ear. The hearing in the ear was destroyed, but the labyrinthine reactions were nearly normal. The facial canal, below the horizontal semicircular, had been partly uncovered. Following a plastic operation on the mastoid and auditory canal the ear healed and the facial paralysis improved.

Verdun Front. High explosive shell fragment tore through the left cheek, auricle, auditory canal and middle ear and penetrated the superior part of the mastoid, causing facial paralysis and a general infection in the mastoid and middle ear. When the soldier was received at No. 11 the canal was much constricted by the contraction of the scar tissue, and the auricle was in the position shown in the photograph. The suppuration in the mastoid was practically healed. In the plastic operation, done under the direction of Col. V. P. Blair, the auricle was freed and lifted forward and upward to bring it into nearly normal position and a flap turned forward from the mastoid region to form the posterior portion of the auricle.

Chateau Thierry. The superior portion of the auricle was torn off by a piece of high explosive shell. The injury was followed by complete deafness in the ear; rotation tests showed that the labyrinth was also destroyed. An unsuccessful attempt was made to save the severed portion of the auricle. This soldier was one of the very few men who preferred a prosthesis rather than a plastic operation.

XXXIII.

A CASE OF BRAIN ABSCESS DEPENDENT UPON EMPYEMA OF THE FRONTAL SINUS.*

By Lieut.-Col. Thomas J. Harris, M. R. C.,

City.

W. P., age twenty-six years, native of Mississippi, was admitted to the eye ward of U. S. General Hospital No. 14 on September 10, 1919, suffering from a swelling of the right eye. Family history and past personal history negative. Both lids were found swollen and the conjunctiva congested. Vision 20/50 in each eye. He was referred to the Department of Otolaryngology for a report as to the condition of the nose and accessory sinuses. The swelling involved chiefly the outer third of the orbit. No pain was complained of. The fundus was normal. Examination of the nose showed pus high up on the affected side. Irrigation of the antrum brought away pus. There was a deviation of the septum to the right. A diagnosis of pansinusitis on the right side was made and confirmed by X-ray pictures. An intranasal operation for correction of the septum to secure better drainage was advised but refused. The patient gave the impression of being a person of low intellect. He spoke slowly and with a distinct drawl. As a result of local treatment the swelling for a time improved. At the end of a month, however, it had increased to such an extent that the eye was closed. Under threat of court martial the patient finally consented to operation. A radical Killian operation was performed by Captain Francis W. White on November 25th. This will be reported by him in the near future. It is sufficient here to state that a large defect was found in the posterior wall of the sinus, together with extensive necrosis in the anterior wall. The dura did not appear to be affected. The wound was only partially closed

*Read at the meeting of the American Laryngological Association, Atlantic City, June 16, 1919.

and a drainage tube was introduced. Convalescence was slow. The patient suffered from repeated attacks of vomiting. This was thought to be due to his enormous appetite and overeating. There was at this time no complaint of headache nor any alteration in the pulse or temperature curve. Complete healing took place only toward the end of January. He was on the point of being transferred to the medical ward for a supposed digestive disorder when in a casual way the nurse in charge remarked that the patient's eyesight had been rapidly failing during the last few days. A test of his vision confirmed this and an examination of the fundus revealed two diopters of neuritis. Careful palpation of the operated field showed a soft, apparently fluctuating mass. The temperature and pulse were normal. There were no paralyses. A diagnosis of brain abscess was made, which was confirmed by the neurologist. After careful consideration, an expectant course of treatment was decided upon. For the next few hours no change could be marked in his condition except an increase in his apathy. Suddenly, at the end of twenty-four hours, he became almost completely comatose. The pulse dropped to a little over forty and the optic neuritis was found to have increased since the last examination to three diopters. Immediate operation was decided upon. This was performed under 1 per cent novocain. An incision was made directly through the integument over the swelling. Retraction of this revealed at once the dura with little or no granulation tissue intervening. Palpation at this time no longer gave any sensation of fluctuation. With the desire to reduce to a minimum the danger of meningitis, extreme care was exercised in the exploration of the frontal lobe. A probe introduced through the dura immediately entered a large cavity without meeting any resistance at all. Bearing in mind the proximity of the ventricles, the probe was not carried beyond two centimeters. Pus in quantity was not evacuated, a few drops only following the incision of the dura. No irrigation whatever was made. A rubber drainage tube was introduced and held in position by a suture to the outer wound. The wound was left open. An immediate improvement in the condition of the patient took place. His pulse in the course of a few hours returned to normal, and within seventy-two hours he was mentally in the same state as he

had been a short time previous to the onset of the active symptoms. There was at no time any escape of cerebrospinal fluid. A small brain hernia took place which gave some trouble. Amputation of the protruding mass was practiced with benefit. The patient was still in the hospital when I left in February. Later reports are to the effect that while it was necessary to open up the wound for the purpose of better drainage, and the patient proved to be the victim of recurring erysipelas, there had been no return of the brain compression symptoms.

Comment.—Brain abscess due to disease of the accessory sinuses has attracted, compared with brain abscess of otitic origin, comparatively little attention. It is, however, by no means an uncommon complication. In 1919 a careful review of the literature was made by Gerber, who succeeded in finding reports of 240 cases of intracranial complication dependent upon disease of the accessory sinuses, of which 65 were brain abscesses. Since then cases have been reported by Berens, Mackenzie, Freudenthal (four cases), Onodi (three cases), Butzengeiger, Heigel, Elschnig (two cases), McCoy (two cases), Zemann and Piffl among others—in all eighteen cases, including our own. Even these probably do not begin to represent the actual number, for, as Freudenthal justly remarks, many cases have occurred following operation which were never reported, and many cases have occurred which were not recognized antemortem. Gerber's statistics show that brain abscess occurs most frequently between thirty and forty, and is much more common in males than in females. In the great majority of cases necrosis of the posterior wall of the frontal sinus, most often associated with perforation, was shown at the time of operation—forty-nine times out of sixty-five in Gerber's cases, of which forty-four showed an actual defect. As distinguished from abscess of the temporosphenoidal lobe, abscess of the frontal lobe is virtually symptomless. Unless the disease has extended beyond the silent area no paralyses take place. This greatly increases the dffiiculty of making an early diagnosis. Headache is probably the most characteristic symptom. It is by no means constant or characteristic in its location. In our patient headache was never complained of. Several of the case reports contain reference to the apathetic condition of the patient. This was peculiarly

true in our case. His appearance, lack of education, locality from which he came, all tended to ascribe this to other causes than a lesion of the brain itself. Projectile vomiting has long been recognized as a symptom of brain abscess. Repeated references are made in the literature to vomiting. As has been stated, our patient was subject to vomiting for weeks before the abscess was recognized, and to this day we are not prepared to say positively that the cause lay in the brain. The latent period can last for an indefinite time. Only when brain compression has taken place, or the abscess has extended so far as to cause absorption is it capable of easy recognition. At this time, through the changes in the pulse, as well as in the fundus of the eye, diagnosis is not difficult. Clinically speaking, the cases divide themselves into those of an acute and chronic type. The acute cases are associated with pain and temperature. Usually an empyema of the frontal sinus has been recognized and a radical operation performed without relief to symptoms. Often at the time of the operation a disease of the posterior wall of the sinuses is discovered. In these cases immediate operation has followed. In others, the brain has been explored only at an interval of several days. The case of Berens is notable as an illustration of the chronic or latent type. A radical operation for pansinusitis had been performed one year previous to the onset of the pain. The second operation revealed granulations hiding a perforation through the posterior wall. The prognosis is grave, but by no means hopeless. A number of cases reported made satisfactory recovery after operation. This depends upon the type of case, whether one of an acute or chronic nature with a walled off cavity. Meningitis is chiefly to be dreaded.

Treatment.—The presence of a brain abscess dependent on accessory sinus disease calls for an operation to promote drainage. Extreme care is to be exercised in the measures taken. At the same time meddlesome interference is strongly to be condemned. Where disease of the dura is recognizable and a fistula is discovered leading into the brain, it is in order to thoroughly explore and drain. Measurements of the brain in this locality show that it is safe to work forward and backward to a distance of 2½ centimeters without danger of wounding the lateral ventricle. Usually after the abscess is

found, direct drainage is all that is necessary. As McCoy points out in his report of two brain cases, drainage is all important. In the latter of his two cases he secured this by making a second counter opening through the lateral wall of the temporal bone. To this procedure he ascribes the recovery of the patient. In the absence of clear evidence of a walled off cavity, especially where no disease of the dura is recognizable pointing to the blood or lymph vessels as the channels of infection, a simple decompression operation is deserving of consideration . A valuable suggestion is made by Elsberg, who states that if before an abscess of the brain is opened a packing of gauze soaked in tincture of iodin is placed under the dura all around the wound the danger of meningitis is practically avoided. He further recommends that two drainage tubes be introduced, neither of which should be removed until ready to be taken out and that they should be shortened from time to time.

BIBLIOGRAPHY AND ABSTRACTS OF CASES OF BRAIN ABSCESS REPORTED IN THE LITERATURE SINCE 1909.

Berens, T. P.: *The Laryngoscope,* Vol. XXVI., 1916, p. 1085, ff. W., age thirty years. Radical operation for pansinusitis on January 16. This did not stop discharge and pain. One year later a second operation discovered granulations in the roof of the sinus. These were hiding a perforation through which a probe extended 2⅛ inches. Rubber drainage inserted. Cure.

Butzenzeiger: *Münchener Medizinische Wochenschrift,* 1911. Case of cured frontal sinus abscess. No details.

Elschnig, A.: *Prager Medizinische Wochenschrift,* Vol. XXXIX, 1914, p. 37. Case 1.—Boy, age twelve years. Phlegmon of left upper eyelid. Incision. Apathy. Paresis of right side of body. Roof of orbit removed. Incision of frontal lobe abscess. Cure. Case 2.—Male, age forty-five years. Chronic frontal sinusitis. Killian operation. Aphasia. Orbit contained granulations. Removed orbital roof and incised abscess in frontal lobe. Exitus. Purulent meningitis.

Freudenthal, W.: *The Laryngoscope,* Vol. XX, 1910, pp. 60-75. Case 1.—J. S., age twenty-five years. Headache and discharge. Acute empyema of right frontal sinus. Edema of

right eye. Radical operation on frontal sinus and incision into bulging dura both evacuated pus. Drainage through nose. Patient in stuporous condition. Second opening of dura emitted more pus. Death in a few hours, due, it seems, to delay of operation. Case 2.—L. K., age twenty-five years. Swelling over right eye two weeks after attack of influenza. Frontal sinus opened after Kuhnt, evacuating pus. Part of bone removed. Semistupor and bulging of dura led to second operation five days later. Incision of dura evacuated about 100 cubic centimeters of pus. Cure in six weeks. Case 3.—L. S., age nineteen years. Semistuporous condition and edema of left eye and forehead. Removal of small portion of anterior wall of frontal sinus evacuated pus. Stupor. Motor aphasia. Later, paralysis of right upper and lower extremities. Second operation made wide opening into frontal sinus and opened ethmoid cells, evacuating pus. Probe discovered that the sphenoid sinus and adjoining brain tissue formed one large abscess cavity. Death in a few hours. Case 4.—Tailor, age thirty-eight years. Frontal sinus and ethmoid cells opened, both showing some pus. Continued pain led to reopening of frontal sinus two months later, disclosing no pus. Dura incised with negative result. Exitus in coma. No autopsy was permitted, but the assumption that there was one or more pus cavities within the brain seems safe.

Gerber: *"Die Complicationen der Stirnhöhlenentzündungen,"* Berlin, 1909.

Heigel: *Prager Medizinische Wochenschrift*, 1914. Patient, age thirty-three years. Case of acute sinusitis. Fifth day, radical operation. Eight days later, incision of dura. No pus. Exitus one month later. Organisms of diphtheria and influenza.

Mackenzie, G. W.: *Proceedings of the Royal Society*, 1914. A manifest fistula in frontal sinus. Abscess in orbit. Opened and drained. Fistula did not close. Six weeks later operation; X-ray "normal frontal sinus." Probe entered large abscess in frontal lobe through opening in posterior wall. Drained. Recovery. Disease present of frontal and maxillary sinus.

McCoy, J.: ANNALS OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY, Vol. 19, 1910, pp. 287-294. Case 1.—J. L., age one

and one-half years. Upper eyelids swollen after attack of pneumonia. Incisions evacuated pus. Operation on frontal and ethmoid regions, discovering necrosis. Incisions into forehead disclosed osteomyelitis. Paralysis. Frontal lobe entered through dura, emitting pus and ceerbrospinal fluid. Death in a few hours. Case 2.—H. E., age ten years. Incision of swollen upper eyelids. Frontal sinus exposed through Killian incision. Incision of swelling on left forehead discovered epidural abscess. Area of necrotic bone removed. Two months later ethmoid labyrinth removed. Convulsions. Large abscess found in the brain but not drained well, and five days later a second abscess appeared. Both are now well drained. Recovery.

Onodi: *Semon's Internationales Centralblatt*, Vol. XXVI, 1910, p. 423. (Transactions of the International Medical Congress in Budapest, 1909.) Three cases of brain abscess. No details.

Piffl, O.: *Prager Medizinische Wochenschrift*, Vol. XXXIX, 1914, p. 39. Male, age thirty-six years. Chronic frontal sinusitis left. Exophthalmos. Intranasal treatment. Cerebrospinal fluid cloudy. Diplopia. Vomiting. Ptosis. Killian operation. Optic neuritis. Five weeks later, pain and rise of temperature. Vomiting. Oribtal roof removed. Frontal lobe incised. No pus. Exitus. Postmortem: Left frontal lobe adherent to orbital roof. Abscess in frontal lobe.

Zemann, W.: *Zeitschrift für Laryngologie, Rhinologie und ihre Grenzgebiege*, Vol. VI, 1913-14, p. 545. G. B., age thirty-seven years. Chronic frontal sinusitis. Fistula through left eyebrow. Killian operation on both sides. Necrosis of posterior wall of right frontal sinus. Facial paralysis on left. Paralysis of left hypoglossal nerve. Left hemiplegia. Clonic spasms of upper extremities. Stupor. Cheyne-Stokes breathing. Exitus. Postmortem: Leptomeningitis. Frontal lobe adherent to posterior surface of frontal sinus. Cortical abscess in frontal lobe. From here there is a fistula leading to two deeper abscesses in frontal lobe.

Elsberg: *Annals of Surgery*, Vol. 66, 1917, p. 508. Abscess of the frontal lobe following orbital cellulitis.

XXXIV.

EXPERIENCES IN THE SURGERY OF THE THYROID GLAND.

By Joseph C. Beck, M. D.,

Chicago.

The surgery of the thyroid gland is so extensive that it is impossible to cover the field in any reasonable time limit. I have therefore taken the liberty of selecting certain points for discussion which I consider of practical value and upon which there is great unanimity of opinion.

I.—CAUSE AND EFFECT.

One of the best things that I have learned in recent years in connection with thyroid disease, perhaps more from the etiologic than surgical standpoint, is that chronic septic foci, either blind or embolic, such as are located in the alveolus of a tooth, or on the palatal surface of the tonsil capsule, cause or contribute to the cause of thyroid disease, particularly of the toxic form rather than those that have access to the outer wall. The greatest proof of this is that the removal of the septic foci so commonly causes the thyrotoxic disease to disappear or to be very favorably influenced.

II.—INDICATION FOR OPERATION.

1. Except in the presence of marked cardiac degeneration and other severe constitutional disease, operation should be performed on all cases of exophthalmic goiter not cured by the removal of existing septic foci. By procrastination with all sorts of remedies, various rays, and electric treatments, cardiovascular degeneraiton may develop and make the operation extremely dangerous or impossible.

When a patient presents himself with the earliest symptoms, susceptibility to fatigue, irritable disposition, frequent headaches, and an increase in the pulse rate (it need not be more than 80-85 at first), a thyrotoxic disease should be suspected.

Recently Dr. G. W. McCaskey published his results on early diagnosis of the thyrotoxic state by means of the Benedict apparatus, in the determination of metabolic changes suggestive of thyroid disease.

The thyroid gland need not be enlarged, in fact, in most cases it is not.

2. A thyroid gland causing interference in respiration, speech, digestion or a laryngotracheal cough, should receive early surgical attention. Delay or treating by any other method is only postponing what is best for the patient, making it more difficult and leaving changes from which there is very slow or no recovery. I have reference to tracheal collapse with chondromalacia, paresis of the recurrent laryngeal nerve and pouch dilatation of the upper part of the esophagus.

3. Surely cosmetically there are many large thyroids that should be operated upon, even though they cause no local or systemic disease. Of course, such operations should only be performed at the solicitation of the patient. In former years and in consonance with the practice of others, I have refused to operate on such cases, and I know there are many men now who refuse the patient that request on account of the dangers, such as the operative risk, myxedema, etc. I now feel that there is a greater danger from the possible development of a thyrotoxic state or local compression symptoms than from an operation of this character at the present time. As a matter of fact, every permanently enlarged thyroid gland is subject to a change producing a thyrotoxic state. I do not mean, however, that this constitutes the sole indication for operative interference. The patient, however, must be watched for the earliest symptoms of local and general changes.

4. Primary malignancy in the thyroid is not frequent and is usually not diagnosticated until it is too late to operate successfully. A hard nodular gland in an elderly individual is suspicious and should be operated upon radically. I shall discuss this radical operation later.

III.—CHOICE OF ANÆSTHESIA.

This is one of the important factors from the surgical standpoint. Morphin should be administered hypodermically, ¼ grain one-half hour before and ⅛ grain at the beginning of

the operation. Atropin 1/150 grain is added to the first dose of morphin.

Local anesthesia is much to be preferred by thorough infiltration with apothesin or procain solution, 1 per cent. When in the course of the operation it becomes necessary to handle the gland, especially in the depths of the neck, nitrous oxid and oxygen should be given by means of a mouth tube, not forcibly but merely allowing the patient to breathe it mildly. Only in very nervous individuals do I resort to general ether anesthesia, and even under these circumstances the operation is begun under local anesthetic.

IV.—CONTROL OF BLEEDING.

Immediate ligation assures control of bleeding. Every vessel that calls for an artery forceps might as well be ligated at once, because the weight of a number of artery forceps may interfere with respiration; besides they take up space in the operating field and make manipulation of the gland more difficult. I prefer the use of catgut ligatures which will be absorbed if aseptic precautions are complete. If infection recurs their elimination is much more rapid than if silk is employed.

V.—AMOUNT OF GLAND REMOVED.

I see ever so many cases that have been operated in which the entire lobe of one side is removed and a portion of the opposite lobe, leaving an unsightly mass on one side of the neck and a hollow on the other. Of course, if only one side is enlarged, then the greater part of that lobe should be removed and very little of the opposite side so as to give the neck a uniform shape. It is my rule to remove portions of both lobes, allowing the greater portion of the capsule to remain, thus avoiding both the parathyroid glands and recurrent laryngeal nerves.

In the cases of suspected malignancy, a small section is removed and sent to the laboratory for an immediate frozen section and another is saved for a regular microscopic preparation. If a positive report of malignancy is returned (operator having suspended operation for the time being), then the radical operation is performed. This means that the gland is

taken away with capsule, observing great care not to injure the recurrent laryngeal nerve. We can scarcely take into consideration tetany or myxedema in the presence of cancer. In such cases recourse must be had to subsequent feeding of parathyroid and thyroid glandular extracts.

In some inoperable cases (two cases in my own practice), where tracheotomy is indicated as an urgent measure, it may be impossible to carry out this procedure on account of the difficulties present, as for instance, when the trachea cannot be reached within the region of the neck. In such cases it may become necessary to resect the clavicle and reach the trachea below. It must, of course, be borne in mind that there is danger of a lung collapse on one side from opening the pleura, which will further embarrass breathing, yet it may become an operation of last resort to prevent the patient from choking. The main lesson drawn from such cases is "not to wait too long with the tracheotomy."

VI.—MANAGEMENT OF EXOPHTHALMOS.

The protrusion of the eyeballs is at times so marked that the cornea is endangered by the development of an ulceration. It frequently becomes necessary to treat the superficial keratoconjunctivitis; the protection afforded by goggles will assist a great deal.

Following thyroidectomy, where other symptoms of the thyrotoxic state become very much less, the exophthalmos should also become less, but while there is an improvement in some of the cases, in the majority it remains stationary, as I have proven to myself by the aid of an exophthalmometer. If in such cases a recurring irritation and ulceration of the cornea is present, then I would recommend a surgical procedure which I have carried out successfully in one case. It is a sort of decompression of the orbit.

Technic of the Operation.—First the same procedure is performed as in the Kroenlein, except that the exsection of the external orbital wall is begun well back towards the posterior pole of the eyeball to as near the optic foramen as possible, and a strip of periosteum excised. If the recession of the eye is not sufficient, then the second is undertaken, namely: after a thorough middle turbinectomy and

ethmoid exenteration has been carried out, so that the lamina papyracea is exposed throughout its greater extent, a beveled chisel is pushed gently through it and a piece of bone (lamella) broken off into the nasal cavity. By means of the Brünings septum forceps the greater portion of the lamina is removed. Care is taken not to injure the periosteum of the orbit in this location on account of the danger of infection.

VII.—THE RECURRENT LARYNGEAL NERVE PARESIS AND PARALYSIS.

It has already been suggested that in the present day operation of thyroidectomy, in intracapsular removal of the gland, is not likely to cause any injury to the nerve. There is a possibility of a hoarseness due to a paresis following the operation, from a marked reaction inflammation in the tissues above the nerve. This usually takes place anywhere from the second to the fifth day, differing in this respect from the paralysis that follows immediately after operation when the nerve has been actually injured. In this respect it resembles facial paralysis after a radical mastoid operation, which comes on some time after the operation when due to an inflammatory process, while complete facial paralysis is present on awakening from the anesthetic when the nerve has been actually injured. In both instances of paresis due to surrounding inflammation rapid recovery may be expected. However, the prognosis is much better in complete paralysis of the recurrent nerve than in facial paralysis, because there is a great chance of compensatory action of the healthy side of the larynx. In other words, nerve fibers of the healthy side may cross over and become distributed to the paralyzed side. It is always well to make a laryngeal examination before doing a thyroidectomy, because in quite a number of cases, especially the adenomata and cystomata of the thyroid, a paresis may be present before operation.

The most satisfactory treatment for the paresis due to inflammation is the use of the galvanic and sinusoidal currents over the region of the larynx. In the complete paralysis due to injury there is not much good obtained from any kind of treatment.

VIII.—THE PARATHYROID GLAND INJURY WITH TETANY.

As in recurrent laryngeal nerve, injury of the parathyroid is less common than before intracapsular thyroidectomies were performed. Tetany develops following an operation in which these glands have been destroyed or become markedly affected. It is best to meet the symptoms by the administration of large doses of calcium lactate and the use of glandular extract of parathyroids. I have had one such case in consultation, in which the operator stated that an intracapsular operation was performed, but the patient developed a typical influenza following the operation, and in the wake of this the tetany developed. Recovery was complete after a few days.

IX.—MYXEDEMA.

This, too, is comparatively rare, especially of late, for the reason that considerable gland is left in performing the intracapsular operation. If symptoms of myxedema develop, then thyroid tablets should be administered in doses to overcome the symptoms. I have had a case that required between 50 and 75 grains daily for an indefinite period, with absolutely no untoward effects from the use of the thyroid extract. The destruction of the thyroid in this case was due to the intensive X-ray treatment. I shall discuss this case later.

X.—INFECTION AND CICATRIZATION.

In a fair number of cases a suppuration around the ligatures occurs, and if silk is employed fistula formation will result until the threads are extruded. In all such cases a considerable amount of scar formation follows in the tissues in the depths of the neck, and every time the patient swallows there is a dimpling of the scar. Severe septic infection is very seldom seen, and in deeply situated glands, especially substernally, a drainage tube is necessary to prevent infection. Drains have been and are still employed in thyrotoxic states, on the supposition that there is less chance of developing an acute thyrotoxic condition after operation from the spilling of some glandular tissue during the manipulation of the gland. I have not been observing this precaution for some time and have not had any bad results from the absence of drainage.

XI.—REVIEW OF THE SURGICAL PATHOLOGY.

The Mayo Clinic, through the efforts of Wilson, has contributed more than all other clinics put together, and their last work on this subject should be studied by everyone interested. The study of cases that have come under my own observation may thus be classified:

1. Simple adenoma.
2. Adenoma, with colloid degeneration.
3. Adenoma, colloid degeneration and cyst formation.
4. Adenoma, calcareous degeneration.
5. Adenoma, with extreme vascularization.
6. Complete cystoma and hematoma.
7. Atrophy with cicatrization.
8. Chronic infections, such as lues, tuberculosis and malaria.
9. Acute thyroiditis with abscess, primary or secondary.
10. Neoplasms, benign, malignant.

There are two types of thyroid gland tumors to which special attention should be called from the surgical point of view:

1. The substernal or subclavicular form. 2. The socalled internal or base of the tongue goiter, also known as accessory goiter.

Surgically the substernal or subclavicular goiter gives trouble by the excessive bleeding that follows its liberation and oftentimes the embarrassment in breathing by tracheal compression. In all such cases where there is already considerable difficulty in breathing from tracheal compression, I introduce a semiflexible tracheal tube (Ingals) preliminary to the operation, thus obviating this embarrassment.

To control the bleeding mentioned, I have had to resort to the substernal and subclavicular pack in several instances, because it was impossible to control the hemorrhage by packing bleeding points. This packing could always be taken out the next day without recurrence of bleeding.

I have had four cases of lingual thyroid, each case being of particular interest in that the symptoms and termination were different

At this point I wish to say that it is of extreme importance to determine whether the lingual thyroid is the sole gland present so that its removal may not be followed by myxedema.

REPORT OF CASES.

In making this report, I shall present only one of each type as described, and shall discuss the salient points referable to that case as a sort of a summary to the subject.

Case 1.—Miss D. (Figure 1) has had nervous spells, as she called them, for several years, in that her heart would beat very fast; she also suffered from headaches and lost considerable in weight. Examination revealed a somewhat enlarged thyroid, some teeth with apical absorption as shown by the radiogram, and small tonsils. There was a constant tachycardia 140-170 per minute.

Operation: Thyroidectomy caused some improvement for two months, but it was then followed by recurrence of symptoms. Removal of six teeth condemned by X-ray diagnosis. There was some improvement for about four months, but she again lapsed into the thyrotoxic state. I removed her tonsils, after which she again improved and finally lost all the symptoms. She has been well now over two years.

Case 2.—Mr. G. (Figure 2). A most profound thyrotoxic state with marked symptoms of exhaustion. Examination showed a large soft thyroid; pulse rate 160 nearly all the time; a number of teeth condemned by X-ray examination and very markedly degenerated tonsils. After administration of thyroidectine for several weeks, I ligated the superior thyroid arteries. He improved somewhat for a while, but not until his teeth and tonsils were removed did he show permanent improvement.

Case 3.—Miss K. (Figure 3). Marked symptoms of thyrotoxic state, large thyroid and exophthalmos. Removal of both tonsils caused a most striking abatement of symptoms immediately after operation without subsequent recurrence. Thyroid enlargement and exophthalmos were much reduced in size.

Case 4.—Mrs. P. (Figure 4). Severe thyrotoxic symptoms with marked exophthalmos, so much so that she has a constant

keratoconjunctivitis that required protective treatment by keeping her lids sealed by adhesive plaster. There was practically no thyroid palpable, and there were present several infected apices of teeth and very small but diseased tonsils. Some improvement resulted from ligation of both superior and one inferior thyroid arteries. Removal of all bad teeth and the tonsils was followed by most remarkable and permanent relief from all symptoms, now over two years.

Case 5.—Mrs. W. (Figure 5). Marked difficulty in breathing, especially at night. Has been treated for a long time for asthma. Examination showed a definite thyroid enlargement below the sternal notch. Subsequent laryngotracheoscopy revealed a compression of the lumen of the trachea. Removal of the thyroid from the substernal region gave immediate and permanent relief.

Case 6.—Mrs. Z. (Figure 6) (picture before operation could not be taken) for more than six months has had difficulty in swallowing, and during the previous two weeks she could get practically nothing down, especially solid food. The breathing was also somewhat affected, and the patient complained of a marked fullness in her head and eyes Examination showed a very large thyroid, especially laterally, with marked distension of the veins of the neck and face. The conjunctivæ were very much engorged. A small esophagoscope showed marked compression, but absolutely a normal mucous membrane. Removal of the greater portions of both lobes, which appeared to compress the esophagus and the internal jugular veins rather than the larynx or trachea, gave the patient immediate and permanent relief.

Case 7.—(Figure 7.) Patient for the past five years noticed her neck, especially on the left side, gradually increasing in size, but during the past three months there has been a very marked increase. She has also had three distinct attacks of sudden tenseness in the neck with choking sensations. Examination showed a somewhat fluctuating tumor of the left sided thyroid region, but no pain. I made the diagnosis of cystic degeneration of a thyroid gland. Operation proved this to be true. There was very little thyroid tissue present within the capsule of the left side of the thyroid; on the right side was a normal gland.

Case 8.—(Figure 8). Mrs. W. has for years had a large neck which she desired to have reduced. There were absolutely no symptoms present. Removal of the greater portions of both thyroid lobes gave a perfect cosmetic result.

Case 9.—Miss W., age seven years. A swelling on the neck for the past three years, which in the previous four months has shown a tendency to grow rapidly. The growth was not causing any other symptoms. Examination showed a soft lobulated mass, irregular in outline (Figure 9A). A diagnosis of lipoma in thyroid region was made, and this was confirmed by operation.

Case 10.—Mrs. S. (Figure 10), forty-three years old, for a number of years has noticed an enlargement about her neck, but only recently has it been growing manifestly, and becoming harder. Examination showed a nodular tumor in the somewhat enlarged thyroid gland, causing no symptoms whatsoever. Suspecting beginning malignancy an immediate operation was urged, and a radical procedure, as mentioned in the paper, was planned. After exposing the tumor the growth could be differentiated by its pale appearance. A piece was cut out for immediate freezing microscopic section, and it was shown to be calcareous infiltrated thyroid tissue. Consequently only the usual intracapsular operation was performed. No malignant process has developed during the three years succeeding the operation.

Case 11.—Mrs. K. (Figure 11), age fifty-two years, for many years has had a thyroid enlargement, but recently began to show rapid growth with very marked thyrotoxic symptoms. Advised to proceed the same as in Case 8. Under local anesthesia the thyroid was exposed and a piece removed for immediate freezing microscopic examination. While waiting for the report the patient had a violent nervous attack of muttering delirium with a pulse rate so rapid that it could not be counted, although the pulse was of good volume. Operation was suspended and patient returned to her bed. In spite of all therapeutic efforts, the patient continued with these cardiac and mental symptoms, and in addition developed a marked acetone breath for eleven hours, when she died. The microscopic diagnosis of the piece removed showed it to be carcinoma.

Case 12.—Mrs. J. (Figure 12), age forty-nine years, has had a large neck as long as she can remember, but about six months ago it suddenly started to grow and cause her difficulty in breathing. She consulted a surgeon, who operated, but told her relatives that he had to desist on account of severe hemorrhage which he could not control. I found a hard gland with a deep scar dividing it into two parts, the lower portion growing well down over the upper part of the sternum. X-ray examination demonstrated the absence of that portion of the sternum. Since the patient was in great distress for air, I decided to do a tracheotomy by going through the tumor with the Percy's cautery method. While the bleeding was considerable it was controlled by the scarring of the bleeding points. A piece of tissue removed proved by microscopic examination to be an adenocarcinoma. The patient lived very comfortably for several weeks, dying suddenly from the rupture of a large artery that filled the lungs before anyone could reach her.

Case 13.—Mrs. J. (Figure 13), age fifty-two years, always has had a large neck, which, however, never caused any symptoms until about a year ago, when it began to affect her voice. Soon after, she had considerable difficulty in breathing and swallowing, and also a constant cough. Patient was brought to me in distress for air. Examination revealed a marked hard swelling about the entire neck, extending under the sternum and clavicles. The larynx and trachea could not be felt at any point of the neck. Radiogram of neck and chest showed the tumor extending into the mediastinum. Attempt at intubation by means of the Ingals flexible tube or any other catheter was impossible and, since the patient was rapidly choking to death, I was compelled to get down to some part of the lower portion of the trachea in a hurry. Cutting through highly vascular tissue of malignant character without any attempt to stop the bleeding except by sponge pressure, I reached the trachea near the sternum. On opening it, there resulted no improvement in breathing, and I found that the growth had extended into the mediastinum and compressed the entire trachea. While I attempted to pass a long rubber tube into one of the bronchi the patient passed away.

Case 14.—Mrs. W., age forty-four years, has for many

months been treated for difficulty in breathing and speaking. On examination there was seen a smooth swelling at the base of the tongue about the size of a walnut. It hid the entire epiglottis and glottis. No thyroid gland appeared present externally. I suspected it to be an internal thyroid or a cyst of the epiglottis. It was necessary to do a preliminary tracheotomy. The tumor was easily shelled out from its position and there was very little bleeding encountered. The wound healed rapidly and in a few days it was possible to remove the tracheotomy tube. Figure 14 shows the size of the growth. Microscopic section showed it to be a true thyroid gland. I lost sight of the patient and therefore cannot tell whether or not she developed myxedema, an important matter, as there were no external signs of the presence of any thyroid gland. The other two cases of internal thyroid were extremely interesting, especially since I was able to obtain postmortem examinations in them. One terminated fatally just as the patient was brought to the hospital, and postmortem showed that he developed an abscess in the gland which caused edema of the glottis and suffocation. The other case had his internal thyroid removed and six months later developed a myxedema from which he died in spite of thyroid extract treatment.

Case 15.—Miss R. (Figure 15), age twenty-three years, developed suddenly marked symptoms of exophthalmos with other hyperthyroid symptoms, including a large thyroid gland. Consulted a leading surgeon in thyroid operations, who performed a ligation of both thyroid arteries. An unusual incision (horizontal) was employed in this procedure. Seven weeks later another horizontal incision was made very low and the gland removed. In about one month the patient began to show marked symptoms of myxedema with special symptoms of marked hypertrophy referable to the intranasal structures and tongue. The exophthalmos, instead of decreasing, increased considerably. Administration of thyroid extract, 15 to 20 grains, for some time, caused marked improvement in her symptoms. She is being treated by that method now for over a year.

Case 16.—(Figure 16). Mr. M. A diagnosis of carcinoma of the larynx was made and operation (laryngectomy) refused. He was given X-ray treatment for about two weeks,

when he developed marked symptoms of myxedema. Discontinuance of the X-ray treatment and very large doses of thyroid gland caused the myxedematous condition to disappear. A laryngectomy was subsequently performed and a fair sized thyroid gland was found.

Case 17.—Mr. W. (Figure 17), has had for over a year a left sided exophthalmos which was increasing to such an extent as to threaten the cornea. A diagnosis of retrobulbar tumor was made but not verified. An operation for decompression of the orbit, described in the paper, was performed with the very satisfactory permanent result of recession of the eye.

FIGURE 1.

FIGURE 2.

FIGURE 3.

FIGURE 4.

FIGURE 5.

FIGURE 6.

FIGURE 7.

FIGURE 8.

FIGURE 9.

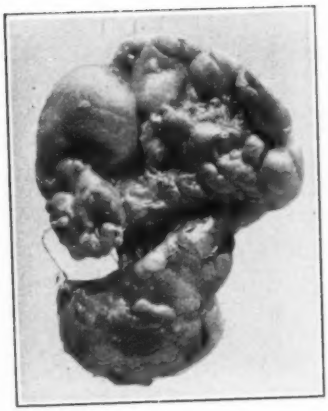


FIGURE 9A.

FIGURE 10.

FIGURE 11.

FIGURE 12.

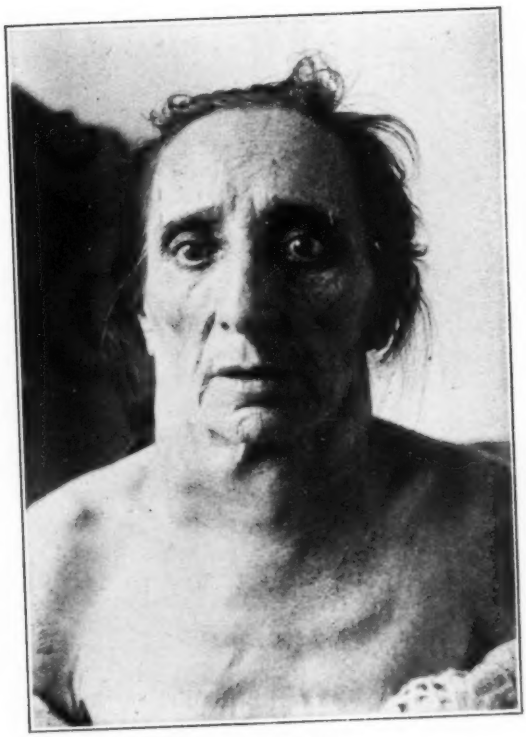


FIGURE 13.

FIGURE 14.

FIGURE 15.

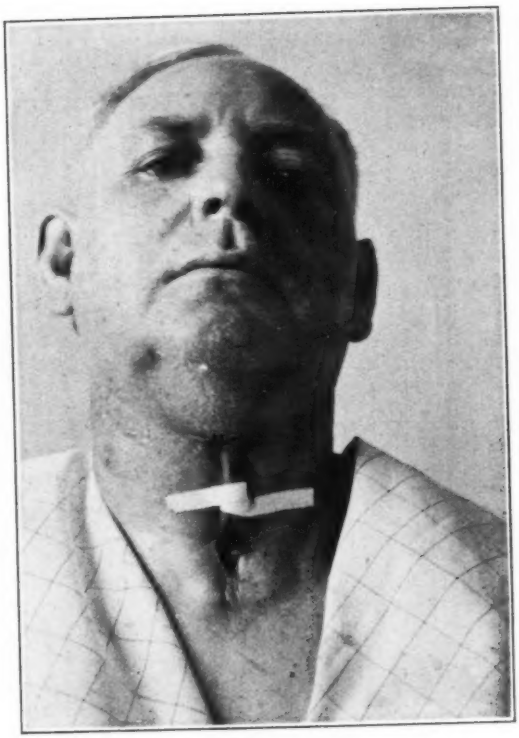


FIGURE 16.

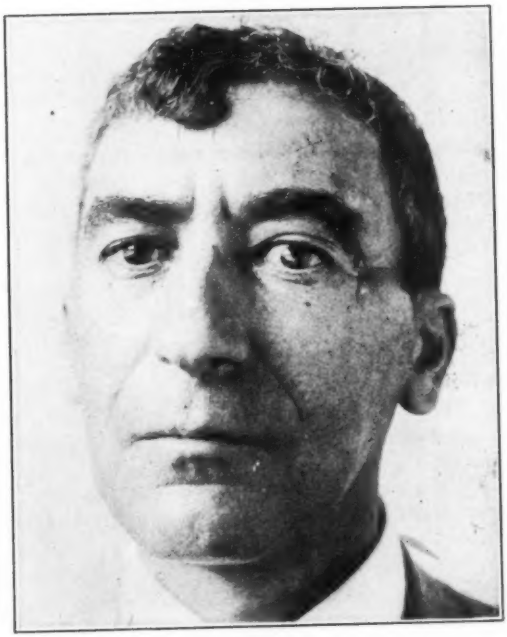


FIGURE 17.

XXXV.

OPEN SAFETY PIN IN THE TRACHEA.

By Richmond McKinney, M. D.,

Memphis.

It is not because this tracheal foreign body is so unusual in character that I take this occasion to report it, but for the reason that there was a lack of definite symptoms of respiratory obstruction, which, even with very excellent radiographs, caused me at first to suspect that the open safety pin was in the esophagus, and as illustrating how misleading this lack of symptoms may prove, even to one who has had considerable experience in bronchoesophagoscopy.

The patient was a little negro girl, aged eleven years, who was referred to me by Dr. O. Dulaney, of Dyersburg, Tennessee, with a history of having the previous day "swallowed" an open safety pin. Radiographs were made at the hospital with which Dr. Dulaney is connected, and as will be seen from one of these here reproduced, the pin apparently was just above the suprasternal notch in the trachea. However, there was no inspiratory, nor expiratory difficulty whatsoever, no tracheal sounds, no cough, and only a slight hoarseness, but the child said she had some pain whenever she attempted to swallow.

No food, other than a few mouthfuls of milk, had been given her before she was brought to me, as it was apprehended that food might carry the pain on down into the stomach, the assumption being that it was in the esophagus. While the radiograph showed the pin as apparently being in the trachea, the absolute absence of respiratory obstruction, and the conviction that the pin, if it had gone into the trachea, would have traveled further down, but in the esophagus would have been held by the first constriction, and collapsible walls of this tube, misled me so far that I esophagoscoped the child, under ether, but not finding the foreign body in the esophagus, used the fluoroscope to determine whether the pin had gone on into

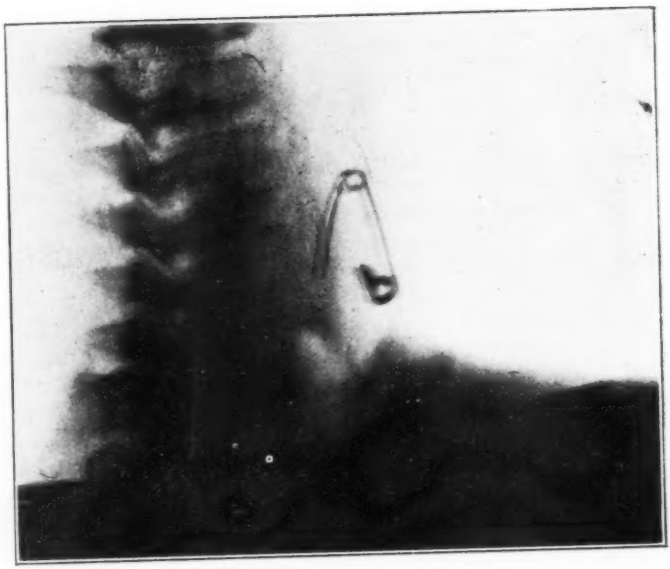
the stomach, and finding it in the same position as shown by the radiographs, passed a Jackson heart-shaped speculum down to the larynx, spread the vocal cords with the point of this, and found the pin just below the cords, with point toward the anterior wall of the trachea. The pin was grasped with forceps and removed without difficulty.

Had this open safety pin gone on down the trachea, and the spring portion of it into one of the bronchi, a very dangerous condition could have eventuated, as there would have been sufficient bulk to have produced considerable, if not total, asphyxiation, and the point of the pin doubtless would have become imbedded, so that the problem of removal would have been vastly complicated. The fact that the pin was open, exercising pressure against the tracheal walls, may have accounted for its having gone no further down, and while ordinarily an open safety pin with point up presents an additional problem in removal, in this instance, the fact that the pin was open probably delayed a serious condition from arising.

In this connection, it may be interesting to mention a case that came to me early in my bronchoesophagoscopic days, when I had far less experience, and certainly less judgment than I flatter myself I now have, in a line of work which can never be otherwise than baffling at times, no matter how many cases of this kind one may have handled.

This was a child of three years of age, who had, as the history usually is given, "swallowed" an eight penny nail. The child was in very good physical condition, as the case was one of only a few days' standing, but examining the patient under the fluoroscope, I listened to the argument of the radiographer, who insisted that the nail, which could clearly be seen, was in the esophagus, and while looking for it in this locality the child became asphyxiated and died before it could be relieved, even with an immediate tracheotomy. I had asserted my conviction that the nail was in the trachea, and censured myself for not having passed a bronchoscope into the trachea first, for I am convinced that I would have thus been the means of saving a life which was forfeit, as not infrequently is the case, to failure to follow one's own impulses and convictions in surgical emergencies.

BANK OF COMMERCE BUILDING.



XXXVI.

A CASE OF CHRONIC BILATERAL ABDUCTOR PARALYSIS OF THE VOCAL CORDS (CRICO-ARYTENOIDEUS POSTICUS). RESULT OF GOITER OPERATION.*

By Arthur M. Corwin, M. D.,

Chicago.

The patient is a young man, aged nineteen years, of English parentage, living in Maywood, Illinois. Both father and mother are living and in good health, fifty-six and fifty years old, respectively. He has four brothers and sisters, aged thirteen to twenty-seven years. One brother, twenty-seven years old, has had a good sized goiter for years.

The patient has had a fair sized, symmetrical enlargement of the thyroid region, extending low in the neck, for some years.

He has had no serious diseases that he remembers; no accidents. The tonsils were moderately large, but there was no history of tonsillitis. He was well and active as a boy. He is now five feet six inches tall and weighs one hundred and twenty pounds, about normal for him.

He first noticed difficulty in breathing about three and one-half years ago, which became gradually worse. In March, 1916, he went to the Cook County Hospital, where he remained for some months. In May, 1916, the tonsils were removed, with no improvement in the condition. In August, 1916, the goiter was operated by a good surgeon. The stitches broke three days after the operation, and the wound opened and became infected. Slow convalescence followed. Immediately following the operation his voice was abolished; he had aphonia for thirty days; thereafter there was a grad-

*Read before the Chicago Laryngological and Otological Society.

ual return of his voice. It was fair but hoarse for sixty days after the operation. Breathing was easy and noiseless.

Soon after this, late in the fall of 1916, he began to have noisy, stertorous breathing when asleep. It was not snoring but a very loud, roaring sound, inspiratory, "audible all over the house." This was very disturbing to everybody else, though he was entirely unconscious of it, sleeping soundly. This stertor disappears when he is awake. However, if he exerts himself beyond ordinary effort in slow walking and easy movements of his arms, dyspnea becomes correspondingly pronounced and is evidently laryngeal. He is therefore not only an innocent but a serious source of disturbance when asleep. He can engage in no selfsupporting occupation of an active muscular kind. He is therefore more than an ordinary problem, both socially and financially, because of the noise he makes, because of his physical inefficiency and because his people are not well off. Furthermore, he is growing gradually worse, so that something must be done for him, and that soon.

You note that his voice is strong, clear and of good quality, which contrasts strangely with his laryngeal dyspnea and noisy sleep.

To look at him now one would hardly suspect that he had anything seriously the matter. A broad ugly scar low in the neck in front and ordinarily out of sight is the only suggestive sign. The remnant of his thyroid gland appears to cover his thyroid cartilage as if compensatorily enlarged. Physically he is otherwise sound.

The heart and lungs are normal. The inspiratory sound over the whole chest is rough and sonorous upon deep, active breathing simply from wide transmission of the laryngeal râle present with forced respiration.

The ears, nose, pharynx and oral cavity are normal. The tonsils have been well exsected. The base of the tongue and epiglottis are normal. The rima glottis is normal, as are the arytenoids. The arytenoid cornua formed by the cartilages of Santorini located at the apices of the arytenoids are unusually prominent, though symmetrical and normal. The patient has

good control over his throat, so that an excellent view can be had.

Upon phonation (expiratory effort) the vocal bands are fairly white and at first sight normal. Upon inspiration a striking fault is at once apparent. The right cord which now seems rather thicker than usual is stationary in the median line, both on inspiration and expiration.

There is no deformity, no morbid history, or local growth or scars to indicate possible ankylosis, as might be suspected. No tenderness or other evidences of arthritis or inflammation in this region are present.

The left vocal cord is in a similar median condition, but fortunately shows slight (very slight) movement in abduction during inspiration, especially in its posterior fourth.

A brief review of the muscular arrangement and nerve supply of the larynx is in order. The superior nerve innervating the interarytenoid muscle (arytenoideus) and the cricothyroideus (external tensor of the cords) are not involved.

The recurrent laryngeal nerve supplying all the other muscles with motor impulse is evidently bilaterally at fault.

An interesting thing in the history points to the recovery of the function of both recurrent laryngeal nerves after the thyroidectomy. The voice returned and there was no dyspnea or nocturnal stertor until some weeks later. The conclusion is, therefore, that the contraction of the extensive scar some weeks after the operation made destructive pressure upon both nerves, which had not been destroyed by direct operative interference, and the patient had time during these weeks to accommodate himself to this slow oncoming paralysis which is so apt to prove fatal when occurring acutely.

. Dr. Will Mayo, commenting upon five thousand operations upon the thyroid, said that loss of voice through injury to the recurrent laryngeal nerve during operation is not rare; possibly ten per cent of the patients have some temporary hoarseness and about three per cent a permanent difficulty with one cord without loss of voice. This is a small percentage compared to the number of cases of paresis or paralysis from goiter pressure.

The left recurrent nerve, which is most frequently afflicted, is deeper and has seemingly received more stretching during embryonic life—and this, as Dr. Mayo has suggested, may account for its greater susceptibility to injury from pressure and trauma. Extensive exposure, he adds, is unnecessary except in removing nodular thyroids which extend beneath the trachea and which therefore displace the nerves.

The scar resulting from trauma incident to extensive exposure may lead to secondary paralysis as in this case—the various opposing sets of muscles which control adduction, abduction and tension of the vocal cords are supplied by fibers ultimately embodied in the same nerve trunk and therefore injury may affect them all or separately.

Mathews of the Mayo Clinic, in one thousand cases of operated goiter, found the cords paretic in seventeen cases. The right cord in ninety-three and the left in one hundred and sixty-two cases, a total of two hundred and eighty-nine partial or complete loss of function. Total paralysis of the right, eighteen times. Total paralysis of the left, thirty times. Abductor paralysis, partial or complete, is most frequent. This apparent frequency may depend upon the more dramatic position of the cord in abductor paralysis. And because recurrent nerve paralysis producing interference with the other function of cords will usually involve the fibers controlling abduction.

The prognosis in this case at this length of time is, of course, bad, as regards usefulness. Indeed, this man may be handicapped through life. As far as his voice is concerned, it is very good.

The question now before us in the presence of such a case is this: The patient is a fine young fellow, in every way able, both mentally and physically, to fulfill his useful part in the world, except for this condition. Should we still further interfere with these vocal cords which threaten his life because he cannot draw them apart? We could cut the cords or remove part of one or both and thereby destroy his voice. Result, physical efficiency and no voice. I have thought it best in this case to advise this procedure, the punching out of part of one or both cords. Dr. Dean has told me of his experience

with a similar case in which he advised that proposition, but in which the advice was not taken and the result was fatal. In other words, this man could be made a useful citizen. Because of the risk, either with a local or a general anesthetic, a preliminary tracheotomy will be done. I shall hope to present the patient at a later date showing good result of operative interference.

XXXVII.

AN UNUSUAL MANIFESTATION OF SYPHILIS.*

By Charles W. Richardson, M. D.,

Washington.

At various times during our professional career we have all met with unusual types and manifestations of this interesting infection. Most of us seem inclined to offer an excuse or make an apology for the presentation of such conditions. I shall, therefore, not make any excuse, as I think we too frequently err in not presenting these unusual types more frequently as aids in diagnosis.

The case which I offer by this paper is rather an unusual type of syphilitic lesion affecting the face in the neighborhood of the nasal orifice.

On January 19, 1919, a married woman of fifty years of age, presented herself at my office with the following history:

She had been of good health until about two years ago, when she began to have a catarrh, affecting the left side of her nose. The catarrh was attended with crust formation, odor and some acrid mucopurulent discharge. The nasal condition continued to grow worse in spite of almost continuous treatment. Her general health began to be impaired, as indicated by loss of flesh, pallor and weakness, attended by impairment of appetite. From time to time she had a considerable amount of pain of a neuralgic character in the left side of the face which was always more pronounced at night. In June, 1918, a small growth began to develop at the lower portion of the left nasal orifice, which gradually increased in size to its present dimensions.

On presentation the patient had the appearance of a woman prematurely old. She was very pallid, somewhat emaciated and very timid. Protruding from the lower margin of the left

*Read before the American Laryngological Association, Atlantic City, June 18, 1919.

nasal orifice and extending down to midway between the nose and the border of the upper lip, with its base directed upward and its apex downward, was a rather prominent grayish white, slightly lobulated, warty excrescence. The mass did not extend into the vestibule of the nose. Examination of the left nasal cavity demonstrated that the passage was filled with a firm crust of debris. After removal of the crust a perforation about a centimeter in diameter was noted in the cartilaginous septum. The inferior turbinate appeared shrunken and in a granulose condition. Probing gently in this region resulted in the uncovering of a sequestrum of bone, which appeared to be the downward curve of the inferior turbinate. It was readily removed.

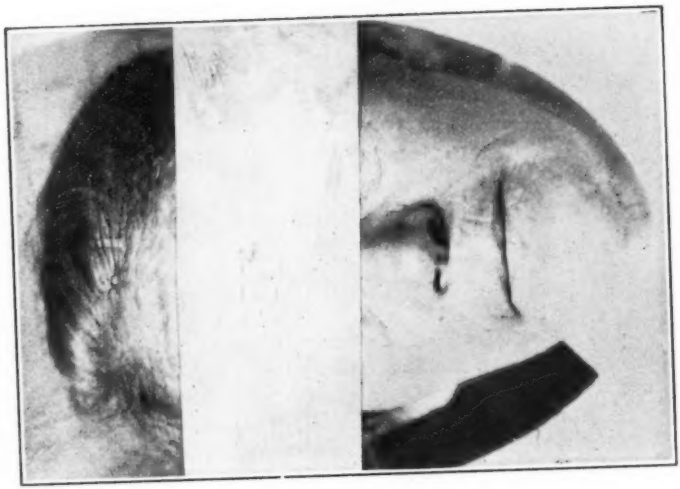
Examination of Pharynx.—Uvula gone; edge of soft palate irregular, and a cicatrix was observed running from the base of the uvula on the left side downward towards the hard palate. Without attempting to obtain a specific history from the patient the lesion was diagnosticated as syphilitic, and the new growth presenting on the face as a condylomata. The patient was placed upon specific treatment; directed to have a Wassermann test, and reassured as to the result.

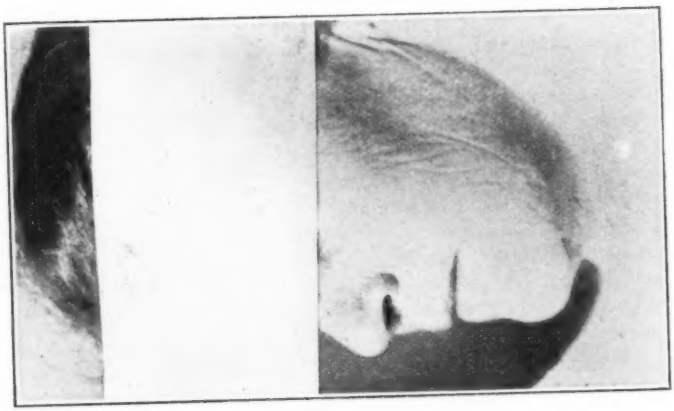
In due time a report was received that the result of the Wassermann was double plus. The patient was given four doses of salvarsan by Dr. Frank R. Hagner, at appropriate intervals. After the administration of the second dose of salvarsan there was a notable shrinkage of the new growth. At the end of four weeks it had entirely disappeared, without scar or other evidences of its disappearance, excepting that the skin over the former site of the growth appeared slightly paler than the neighboring skin. At this writing, two months since its disappearance, the skin has assumed its normal appearance.

The presence of condylomata about the facial orifices is not a frequent manifestation of syphilis. In quite a large experience in the observation of the manifestation of syphilis about the face I have only observed three such lesions of this type. In one of these cases the condylomata formed at the external auditory meatus, in two others at the angle of the lips.

Treatment.—We all know and realize how difficult it is to maintain patients under appropriate treatment after the local

lesion has been relieved and the general well being has been apparently restored to the normal. Under the old method of treatment, which consisted in the administration of unpalatable drugs and inunctions, this was rendered doubly difficult through the repugnance of the patient to the method, the slowness of the result and the effort on our part to keep up the medical morale of the treatment. Under these circumstances there was some excuse for permitting our patients to pass too early from our observation. Today, with the rapidity with which the initial results are obtained, and with the more satisfactory methods employed, we have no excuse for permitting these patients to pass from our medical care until they are nearly or completely assured of a complete result.





XXXVIII.

RETROBULBAR NEURITIS FROM POSTERIOR ACCESSORY SINUS DISEASE, WITH REPORT OF SEVENTEEN CASES.

By Leon E. White, M. D.,

Boston.

After reading Sluder's masterly book, "Headaches and Eye Disorders of Nasal Origin," one hesitates to enter this field. I believe, however, the subject well warrants further elucidation, for in spite of the brilliant writings of Onodi, Loeb, Knapp, Holmes, de Schweinitz, Posey, Hajek, Birch-Hirschfeld, Killian, de Kleyn, Berger, van der Hoeve, Halstead, Stark and many others the subject has not, I think, been sufficiently comprehended. The cases are so rare that one seldom sees enough of them to know what to expect. The usual opinion seems to be that the seat of the trouble is determinable on a casual nasal examination. Pus, polypoid tissue or caries was formerly looked for, but now we recoginze the importance also of a thickened or hypertrophied membrane—hyperplasia, as it is designated. Vail defines this as a "rarefying osteitis associated with inflammatory swelling and fibrous thickening of the mucous membrane lining the accessory sinuses." It is brought about, according to Delafield and Prudden, by long continual hyperemia. Examination of the nose is negative where the hyperplasia does not involve the middle turbinate. It is especially to this type of case that I wish to call attention.

The more one studies the structures surrounding the sphenoid sinuses, the more one is impressed with the importance of a thorough comprehension of the pathologic conditions found here. These sinuses vary greatly in size and position, even in the same individual. They may extend outward and backward into the greater wings of the sphenoid to the Gasserian ganglion and have a capacity of 12 cubic centimeters

or more. The pituitary body, chiasm and optic nerve are in relation to the superior wall, while externally lie the optic, abducens, oculomotor, trochlear, ophthalmic and maxillary nerves, the cavernous sinus, the internal carotid artery, and the dura of the middle fossa. "In some specimens," Killian says, "the blood circulating in the cavernous sinus bathes the whole roof as well as the lateral walls." Bearing these relationships in mind, one can readily see what effect an inflammatory process here might have on these structures. Cases of brain abscess and cavernous sinus thrombosis from sphenoid sinus disease do occur, but fortunately are rather rare complications, while the affection of the adjacent nerves, such as impairment of vision and intense neuralgia, are only too frequent.

As to the vulnerability of the optic nerve much research work has been done. For instance, Francis and Gibson made a study of sixty specimens, in one-third of which the optic nerve was separated from the sphenoid sinus by a paper thickness of bone measuring less than 1/100 of an inch. This frailness was well demonstrated when I was removing the lining of a sphenoid sinus in the dissecting room recently. This bone, in a comparatively fresh subject, was so fragile that it came away with the lining, thus exposing a considerable area of dura. It is difficult to conceive how an inflammatory process could go on in a sinus of this type without causing serious damage. The wonder is that so few complications arise.

De Kleyn and Gerlach made a study of the optic nerve in a case of old sphenoidal sinus disease, and found circumscribed infiltration opposite the sinus. The same capsular diplococci were found in this infiltrate as in the mucosa of the sinus.

As to the cerebral complications from sphenoid sinusitis, I have seen but one case, but in 1905 Dr. St. Clair Thomson gave a brief history and autopsy findings in forty-two, all but two of which were collected from previously reported cases. Most of these ran a very rapid course (as illustrated by my case), and while the findings as to the eyes were meager, they were most interesting as showing the effect on the optic nerve of disease in the sphenoid.

Case 38 of the series is as follows:

"Male, 78: Two and one-half years before death eyesight

became suddenly impaired and subsequently totally lost from double optic neuritis and postneuritis atrophy."

The autopsy showed complete destruction of the walls of the sphenoid.

In twelve of the forty cases loss of vision, with or without changes in the fundi, are mentioned, thus:

In Case 1: Sudden blindness in right eye. Optic disc cloudy.

Case 8. Diminution of vision on one side.

Case 15. Three weeks before admission, failing eyesight was noted.

Case 16. Congested optic discs.

Case 17 (reported in full, it being Dr. Thomson's own case). Had complained that everything was misty before him. Both optic discs were slightly hazy.

Case 21 (also Dr. Thomson's patient). Had double optic neuritis.

Case 24. Complained of dim sight five days before admission to hospital.

Case 25. Had pain in left eye with failing of sight two days later "as from a mist before the eye." Complete blindness followed. The fundus showed dilated veins and edema of papilla. Five days later the right eye was similarly affected.

Case 27. Gave a history of pain in the left eye and diminished vision on that side.

Case 33. Had scotoma and diminished vision in both eyes.

Case 35. Had diminishing vision, ending in complete blindness.

Case 36. Had unilateral loss of vision.

In 1900, Miller reported two fatal cases from sphenoid sinus disease, preceded by sudden and complete loss of vision.

Dr. D. W. Greene reported a fatal case of unrecognized empyema of the right sphenoid sinus, with loss of vision in the right eye. On autopsy "the blood vessels (veins in particular) occupying the floor of the right anterior and middle cerebral fossæ were engorged with blood; the overlying dura was boggy and opaque, and the anterior clinoid processes, together with the superior wall or roof of the right sphenoid, were of a grayish red color, almost black in places, and necrotic. The right ophthalmic vein and artery, the right optic

nerve and other minor structures occupying this position about the right clinoid process were agglutinated and embedded in a mass of inflammatory lymph."

Chisholm, in 1882, reported two instructive cases of blindness from malignant growth in the sphenoid. In the one—a boy of seven—almost complete loss of sight came on within two weeks in the right eye and some loss of vision in the left. There was pallor of both discs. A year later the boy was totally blind in both eyes and both discs were white. In the other case—a physician—loss of vision came on in the right eye several months after the pain started in that side of his head. The disc was pale. Left eye had normal vision at first examination, but five months later it was so poor that he could only see the outlines of large objects. Both discs were white.

Dombrowski also has reported an interesting case of retrobulbar neuritis caused by carcinoma of the sphenoid. At first there was slight blanching of the disc and restriction of the visual field in one eye. Later complete loss of vision in one eye with optic atrophy and commencing loss of vision in the other.

The case of Wood and Wallis is instructive, as it shows the difficulty in differentiating cases of retrobulbar type from those where the optic neuritis is of cerebral origin. Their patient had defective sight for two years in the left eye with vision for hand movements, and the right was also somewhat affected. Vision 6/9, with marked papilloedema. There was pus in the nose. The removal of the middle turbinates and opening of the sphenoids brought about normal vision right and nearly normal left.

The writers up to ten or twelve years ago laid great stress on the intimate relation of the optic nerve to the accessory sinuses, and seemed to feel that pressure was the all important factor. The literature showing the growing comprehension of toxemia and hyperplasia is most interesting.

Krauss was one of the first to express the toxemic view. He said in 1909 that "retrobulbar neuritis is generally supposed to be due to an extension of the inflammation from the sinuses to the optic nerve, but the rapidity with which the retrobulbar neuritis disappears after the evacuation of the

pus from the opened sinuses is often a source of surprise and would indicate that the neuritis was due rather to a local toxemia than to an inflammatory process. It is readily conceivable that, soon after the supply of toxins through the lymphatics to the nerve fibers ceases, the natural recuperative forces are set to work. Another reason for the supposition that we have toxemia to deal with is that the macular fibers are selected for specific action by the inflammation." He cites the case of a patient who had pain in the right eye, accompanied by a very dim sight and a constantly present black spot. There was faint haziness of the retina and contraction of the visual fields. There was an extreme deviation of the septum to the right, and pus was found about the middle turbinate. A rapid cure was effected by resection of the septum and the opening of the ethmoid cells.

Teillais, in 1908, reported a unique case, where toxemia seemed to play the leading rôle. The extraction of a molar tooth was followed by an acute infection of the left maxillary antrum and orbital cellulitis, which spread to the neighboring sinuses, causing blindness and optic atrophy of the left eye and neuroretinitis of the right.

Stevens reported the case of a woman in middle life where the toxemia was so great as to cause stupor, slow pulse, subnormal temperature and headaches, in addition to the more frequent symptom of failing vision and moderate optic neuritis with central scotoma, vision 4/20 each eye. History of nasal discharge suddenly stopping before onset of symptoms. Recovery followed the opening of the posterior ethmoid and sphenoid.

In 1910 MacWhinnie says that because of the fact that in several of his cases the probing of the sphenoid immediately increased the fundus congestion, he was led to believe that these cases were really the result of absorption of toxic products from this sinus through the lymphatics, although "I am well aware," he says, "that, so far, there has not been any established relation between the lymphatics of the eye and the sinus other than the very noticeable widening of the perivascular lymph channels in the axial strand, demonstrated first by Schieck pathologically." MacWhinnie reported five cases giving perimetric charts before and after operation. "Per-

sonally," he writes, "I believe it is good practice to open the sphenoid in cases of optic neuritis or choked disc, showing paracentral scotomata in the visual fields, no possible harm being done if there is not an involvement of the sinus, and if it is present we have eradicated one of its etiologic factors."

Gradle's views as to the etiology of blindness and the blind spot from accessory sinus disease differ considerably from previous writers. After giving the anatomic relations and blood supply of the optic nerve, in accordance with the teachings of Onodi, Loeb, Vossius and Gray, he says:

"These anatomic facts explain the course of disease from the accessory sinuses to the optic nerve. The infection, the edema, or whatever may be the disturbing factor, passes from the sinus periosteum through the diploic veins and lymph channels to the orbital periosteum, thence by continuity to the intracanalicular portion of the dura of the optic nerve, or possibly through the periosteal veins or dural veins, directly to the central vein of Vossius. If the dura alone is involved, thus causing a pressure upon the periphery of the optic nerve within the canal, the peripapillar bundles alone will be involved and an enlargement of the blind spot will result. If the process extends further and involves the central vein of Vossius, surrounding it by an edema, the neighboring nerve bundles will suffer. These happen to be the papillomacular bundles, and there results a central scotoma. Consequently, I believe that I am justified in stating" (contrary to the teachings of Onodi and Loeb) "that the anatomic relations of the sphenoid and ethmoid cells to the optic canal are immaterial when it comes to a question of optic nerve involvement in accessory sinus disease. The trouble is transmitted by the soft tissues alone."

Shumway reported a unique case and expressed a very interesting theory in 1915. His patient had failing sight in one eye for nine years. The fundus showed pallor of the temporal half of the nerve and there was a horizontal oval scotoma for colors; vision, 2/45. Nasal examination showed a necrosing ethmoiditis. Three years later, after a slight improvement, might have been produced by absorption of the toxins from his condition became worse and the writer concluded the case was one of insular sclerosis and advanced the theory that it

the purulent focus in the ethmoid cells. Such a theory would explain the similarity in the lesions of retrobulbar neuritis due to intoxications and those found in disseminated sclerosis.

Stark, in 1916, calls attention to the similarity of the eye symptoms in accessory sinus disease and multiple sclerosis. "The eye symptoms in multiple sclerosis," he says, "are amblyopia, nerve involvement, muscle involvement, including nystagmus, change in the pupil and field of vision. * * * As in sinus blindness, these symptoms are not all present in any one case, the diagnosis being made by the presence of one or more."

In speaking of the etiology, he quotes Auerbach and Brandt, who say that "the relation of multiple sclerosis to retrobulbar neuritis is interesting in so far as the last named affection, in the great majority of cases, in acute as well as in chronic form, is etiologically referable to various intoxications and infections, arousing the suspicion that multiple sclerosis is likewise based on some organized or unorganized poison, crediting the increased frequency of influenza in the last decade with the greater frequency of multiple sclerosis." He also quotes Parsons, who says: "The pathologic condition is suggestive of the presence of a circulating toxin as the cause of the disease." Stark concludes as follows: "The eye symptoms of multiple sclerosis and sinus blindness which have previously been considered different diseases, are to my mind the same, one being an advanced stage of the other."

It may be of interest to give the usual findings in cases of multiple sclerosis, as outlined by Dr. Kampherstein, who describes the eye symptoms in 37 cases, in 23 of which the diagnosis was positive and in the remaining 14 very probable. Most of the cases occurred in young individuals. In 24 there were ophthalmoscopic changes, the most common being temporal pallor—bilateral in eight cases, unilateral in ten cases. There was incomplete optic atrophy in three cases; complete bilateral optic atrophy in one; sector shaped pallor in two; an optic neuritis in one; in five there was an absolute central scotoma; in five a relative central scotoma; in three a central scotoma with peripheral contraction of the field; and in one case green was not recognized in the entire field. Nystagmus was present in thirty cases. Of these, twenty-six had nystag-

mus only in extreme positions of the eye, while in two there was marked nystagmus, even in the primary position.

Bradburne reported a unique case of optic neuritis associated with implication of the abducens nerve from sphenoid disease. The patient had occipital headaches and double vision for twelve months. Examination revealed a slight weakness of abduction of the left externus muscle with some loss of vision and blurring of the left disc. This deviation reached a maximum of 14 degrees some weeks later. The use of cocain and adrenalin was followed by a profuse, thick, purulent discharge from the sphenoid region and a rapid subsidence of the neuritis. There was, however, occasional blurring of the vision for nine months and at times pain, but the diplopia cleared up. The author says that "the implication of this nerve" (the left abductor) "assisted the localization of the seat of the mischief, for such could scarcely be anywhere else than at its situation on the body of the sphenoid where it traverses the cavernous sinus alongside the carotid artery." "It is possible," he says, "that in this case the sixth nerve may have had an abnormal relationship to the carotid, and instead of lying external to the artery, might have laid on its mesial aspect in contact with the bone."

The uselessness of negative findings is well shown by Caldwell, who reported a case in 1892 of double optic neuritis due to unrecognized ethmoid and sphenoid disease. Loss of vision came on during a sea voyage, being preceded by violent pain first in one eye and then in the other. After being examined by many specialists and treated unsuccessfully in various hospitals for two years, his disease was at last correctly diagnosed, although too late to benefit his vision. The pain, which was paroxysmal, was relieved by removal of the middle turbinate and draining the sphenoid sinus, and there was also a marked improvement in his general health, but both optic nerves had atrophied.

Vail, in 1919, reported three cases of monocular retrobulbar neuritis from ethmoid disease, all with negative rhinoscopic findings. Two of these were due to hyperplastic ethmoiditis and one to a suppurative process. In conclusion, he says that in the two cases where "there was no bacterial invasion of the nerve present, there was swelling of the orbital wall of the

posterior ethmoid or sphenoid cell, which pressed the optic nerve in its passage through the optic foramen and caused a strangulation of the nerve at this point. * * This compression no doubt produces a transverse neuritis which, while not due to bacterial invasion, is nevertheless destructive to vision and is followed by more or less permanent atrophy of the optic nerve. * * The nasal disease that produces this phenomenon is a nonsuppurative one, hyperplasia of the ethmoids. * * The disease should be recognized and operation on the ethmoid performed at once in spite of its being normal in appearance."

The result of delayed surgical intervention is well shown in the report of Schimer, who saw a case of five months' duration with vision right, fingers immediately in front of the eye; the left, with proper correction, fingers at 5 m.; the temporal halves of both discs quite white. As suppuration was found in the accessory sinuses on both sides, the middle turbinates were removed and ethmoids treated. There was slight improvement in the left, but further improvement was impossible, as the nerve fibers had already undergone degeneration. An operation on the sinuses when the trouble commenced would, the writer maintained, have stopped the inflammation and saved the vision.

The seriousness of delay and the importance of thoroughness in operating is shown by Risley, who reported a case of marked pathology in a man of fifty-eight years, who had atrophy of the optic nerve of long standing in one eye and a recent loss of vision to 6/60 in the other. "The nerve was gray-red, opaque and margins obscured." There was pain in the frontal region and both nares were filled with polypoid masses. On the removal of these a large quantity of pus escaped and vision rose to 6/15. Seventeen months later it dropped to 1/10, and the nose was again filled with polypi. The patient, however, refused any further operative interference, and after consulting various specialists, both at home and abroad, eventually became entirely blind, and when examined three years after his first visit had atrophy of both optic nerves.

For referring to me the following cases I wish to express my sincere thanks to the physicians mentioned and also to the

house surgeons of the infirmary, who have assisted me in every possible way.

The first three cases have been previously published but briefly, and are as follows:

Case 1.—Miss R. S., age twenty-three years, referred by Dr. H. B. Chandler on April 12, 1911. Diagnosis: Chronic unilateral retrobulbar neuritis. Nasal examination: Pus about sphenoid. Later developed chronic posterior ethmoid disease. Operation advised but refused. Result: Practically blind in one eye.

Case 2.—Mr. C. J. M., age twenty-five years, referred by Dr. William J. Daly on November 21, 1913. Diagnosis: Double optic neuritis. Left sphenoid smaller than right. Operation: Removal of left middle turbinate and opening of left sphenoid. Complete recovery.

Case 3.—Miss J. L. P., age twenty-one years, referred by Dr. F. I. Proctor. Diagnosis: Double optic neuritis. Left eye much worse than right. Operation: Removed left middle turbinate. Complete recovery.

Case 4.—E. G., age twenty-five years, a machinist, was referred by Dr. Verhoeff at the infirmary on April 14, 1916, with diagnosis of bilateral retrobulbar neuritis and optic atrophy. History of excellent health excepting a catarrhal trouble of several years' duration. First noticed a fogginess in vision about two months ago. This came on suddenly and was preceded for several days by severe pain about and behind the eyes. Was treated in the outpatient department on February 28, 1916. Vision, 20/50 right, and 20/70 left. Disc of right eye apparently normal; left disc, paleness of temporal half. Admitted as a house case three weeks later, during which period vision right dropped to 10/200; left 2/200. Pupils reacted normally; vessels normal; left disc pale; central scotoma for red and green. Wassermann and nasal examinations negative. Patient discharged unimproved one week later. Readmitted the following week with vision in right eye now 2/200, left eye shadows. Right disc now also showed pallor on temporal side. Pupils of both were dilated and did not react to light. I first saw the case ten days later, that is, on April 14th, and had him X-rayed; the "left sphenoid was obscured." After a consultation with Dr. Verhoeff it was

decided, in spite of the white discs, to attempt to save the remaining eyesight, so both middle turbinates were removed and the posterior ethmoids opened. As no improvement followed this operation both sphenoids were opened ten days later; they were filled with pus and granulations. Four weeks after the operation "both pupils reacted fairly well; fundi unchanged." Six months later vision for fingers was 2 feet right, 3 feet left, which was an improvement over the vision before the operation.

This case well illustrates the difficulty of making an early diagnosis, and the rapidity with which optic atrophy develops. It teaches the necessity of an early operation, even when the findings are negative.

Case 5.—V. C., age twenty-eight years, a machinist, was referred by Dr. MacKenzie of the infimary, on March 5, 1917. Diagnosis: Double optic neuritis. He was first seen in the Ophthalmic Outpatient Department on March 3, 1917, and gave a history of loss of sight in the right eye for two weeks; vision fingers, 1 foot right, 20/20 left; physical, neurologic and Wassermann examinations all negative; both pupils dilated, the right responding to light but little and the left fairly well. He was seen by me two days later and admitted as a house case. Vision on admission, right eye, fingers at 1 foot; left eye 20/200, thus showing a marked loss in the left eye in the past forty-eight hours. Dr. Quackenboss examined the case and reported "the disc of the right eye pushed forward about two diopters; considerable exudate on and about it; the edges lost, the retinal veins enlarged and tortuous. The left disc also showed marked neuritis but no swelling. Although the nasal examination was practically negative, I at once removed the right middle turbinate and opened the right sphenoid. There was swelling of the mucous membrane, probably a case of hyperplasia. Within twenty-four hours the vision commenced to improve, and when the patient was discharged twelve days later it was nearly normal. On May 18th, ten weeks after the operation, Dr. MacKenzie reported both visual fields and discs normal, except that the right nervehead was possibly a little paler; vision, 20/20 both.

Case 6.—Miss M. C., age twenty-one years, telephone operator; came to the Ophthalmic Outpatient on September 8,

1917. Diagnosis: Unilateral retrobulbar neuritis. She was admitted at once as a house case. History of good health, not subject to colds, but periodic attacks of severe pain over left eye, at which times vision had been blurry for a few hours, but never so bad as at present. This attack came on five days ago with an unusually severe pain over and about the eye. It hurt when she tried to look sideways. The vision was entirely gone for three or four days, and the eye sensitive to pressure. Dr. Quackenboss found a slight blurring of the edges of the left disc. The pupil was enlarged but responded slightly to light. Vision, light perception only. The septum was deflected to the left, and the middle turbinate greatly swollen from a subsiding coryza. The septum was resected at once and the anterior end of the middle turbinate removed. Following this the vision improved so that within forty-eight hours fingers could be made out close to the eye. One week later, fingers at 15 feet. The patient unfortunately contracted another severe cold, and for ten days the vision was greatly diminished, but thereafter improved, although it never became quite normal. As the swelling accompanying the coryza disappeared it was found that the posterior portion of the left middle turbinate, the location of which it had previously been impossible to determine, was obstructing the opening to the sphenoid, and it was removed, together with the front wall of that sinus. The pressure on the nerve had, however, caused slight atrophy. Dr. Quackenboss examined the patient on November 8th, two months after the operation, and reported: "Right eye normal; left eye, vision 20/30; the optic nerve is pale and shows evidence of partial atrophy." In March, 1919, the patient had some pain and blurriness of the other eye, but this cleared up under treatment without impairment of vision. On examination by Dr. Quackenboss on May 10, 1919, the left disc was still paler than the right and there was a certain amount of optic atrophy present, although the vision had improved in the past eighteen months from 20/30 to 20/20 minus, thus showing that there may be improvement some months after the operation.

Case 7.—Mrs. M. J., age thirty-seven years, came to the Ophthalmic Outpatient on September 17, 1917. Diagnosis: Bilateral retrobulbar neuritis. History of severe pain in head

for twenty-four hours, when she noticed that the right eye was blurry; in three days it was totally blind. One week later similar trouble came on in the other eye so that she had to be led into the infirmary. She was admitted as a house case and improved under local treatment for three or four days, then became worse—no light perception in right eye and fingers barely in the left. Her history pointed toward specific disease, so operation was delayed until the Wassermann report was obtained. This was negative, as were also the neurologic, X-ray and nasal examinations. The right middle turbinate was then removed and the right sphenoid opened. Thickened mucous membrane was found—probably a true case of hyperplasia. The sight in the eye on this side commenced to improve within twenty-four hours. A week later the left middle turbinate was removed and the left sphenoid and posterior ethmoid opened. Improvement thereafter was rapid. The patient was examined several times by Dr. Quackenboss, who was able day by day to note the changes in the fundi. Four days after the opening of the left sphenoid he reported that there was still marked neuritis. On the twelfth day he noted "marked improvement; neuritis subsiding; edges of discs made out fairly well; vessels nearly normal." Two days later he reported "right eye, neuritis subsiding; edges of disc quite distinct; nerve has slight pallor; left eye, edges of disc fairly distinct; one or two vessels a little twisted." The patient when seen three months later had practically normal vision.

Case 8.—Miss H. H. age seventeen years, was referred on March 15, 1918, by Dr. Fred M. Spalding of the infirmary. Diagnosis: Bilateral retrobulbar neuritis. History of very severe pain in head some six weeks ago, which was followed by marked bilateral loss of vision. Examination showed blurring of both discs and marked neuritis right. She was referred to the Massachusetts General Hospital, as the trouble at first was thought to be due to pituitary disease. Neurologic, X-ray and Wassermann examinations all negative. Vision left, fingers at 3 feet; light perception only in right. Nasal examination negative except a deflection of the septum. This was resected on March 15th, and the right middle turbinate removed. Six days later the right sphenoid was opened. No pus or granulations but a hyperplastic condition found. The patient

was discharged in nine days, with vision 20/20 left and 20/30 right. The right fundus still showed a slight neuritis. Two weeks later the antranasal wall was broken down and a diseased molar extracted. There still persisted a slight blurring of the disc in the right eye, but on July 9th, some four months after the operation, both discs were clear, and the vision 20/20 both.

Case 9.—Miss M. C., age twenty years, was referred by Dr. Verhoeff. She entered the infirmary April 6, 1918, with exophthalmos of the left eye. For the past two weeks, following a severe cold, there had been pain and swelling about the left eye. The eyeball was pushed forward and outward; vision 20/20 and fundus normal. There was tenderness over the ethmoid region and a moderate conjunctivitis. A diseased molar was extracted by Dr. Wright. On the 9th I examined her nose, which was negative, but as some sinus disease was suspected she was X-rayed; the plates were negative, however, as were also the physical, neurologic and Wassermann examinations. With the subsidence of the exophthalmos the patient first noticed a fogginess in her vision, and on April 21st, some two weeks after her admission, the fundus, on being again examined, showed a commencing choked disc. This grew rapidly worse, so that within four or five days her vision dropped to 20/200 and the fundus showed marked engorgement. On April 27th, six days after the neuritis was noticed, I removed her left middle turbinate and opened the sphenoid and the posterior ethmoid. The patient improved rapidly and was discharged a week later with vision 20/50. One month later, when the left fundus was normal and the vision 20/20, the other eye commenced to pain and the vision became blurry. Dr. Verhoeff found a marked papillitis, with vision 20/200, so she was readmitted to the infirmary, and on June 12th I removed the right middle turbinate, which was tightly wedged between the septum and ethmoidal wall, and opened the right sphenoid. Eight days after the operation the patient was discharged with normal vision. She went along favorably for six weeks when, following a cold, the pain returned about the left eye (the first one affected), and there was diminution of the vision. The left antrum was dark on transillumination, and there was slight blurring of the left disc

with vision 20/30; so on July 24th, all the posterior ethmoids on the left were exenterated, the opening in the anterior wall of the sphenoid enlarged, and a permanent opening made into the antrum, which, by the way, was filled with pus. Patient discharged a week later with vision normal, which remained so for four months, when, following a severe cold, there was some pain in the left eye and a blurriness for two days, but this subsided under local treatment.

This case is unique, at least in my experience, as the optic neuritis of the left eye developed while the patient was under treatment at the infirmary for the exophthalmos of that eye. The neuritis in the right eye came on some weeks after that in the left had subsided; then there was a recurrence of the neuritis in the left eye some weeks after that in the right was cured. The first operation on the left side was the removal of the middle turbinate, an opening into the sphenoid and the posterior ethmoid cell. This is usually sufficient but was not so in this case. That the optic nerve, while not in relation to the other accessory sinuses, may yet become involved from the toxemia of the infection, is, I believe, well demonstrated by this case.

Case 10.—Miss M. E., age twenty-seven years, a patient at the infirmary with neuroretinitis and choroiditis of the right eye, was referred by Dr. Verhoeff on April 16, 1918, more with an idea of seeing what effect the opening of the sinuses would have on the retina than with the expectation that the vision could be benefited. Ten years ago she had paresis of the right facial, but no cause; monthly headaches since a child. About three months ago patient noticed that inner half of field of vision was gone in the right eye. This lasted for about one week, then the other half began to go, so that now she has light perception only. About two weeks ago the eye began to turn out; pupil round, regular and reacts to light; fine floating vitreous opacities; disc swollen and edges not seen; tension normal. The left eye was normal. X-ray of sinuses, Wassermann, neurologic and nasal examinations all negative. On April 20th, I removed her right middle turbinate and opened the sphenoid. The membrane was somewhat thickened, but no pus or granulation. Patient was discharged a week later with no improvement. Some six or seven weeks

after this the pain in the right side of the face, which she had had occasionally, became constant and of such intensity that acetylsalicylic acid in 10-grain doses was required nearly every hour. In the region of the posterior ethmoids soft polypoid tissue was found which, on account of the severity of the pain, was suspected of malignancy, but a small portion removed for examination was negative. Although the Wassermann was negative, Dr. Verhoeff suspected specific disease and had given the patient inunctions and potassium iodid for some weeks. On July 10th, I cleaned out her ethmoids. Granulations and pus were found. The pain which had continued up to that time was entirely relieved and had not returned when seen six months later. This was also true of her periodical sick headaches. The general health was also much better, but the vision was unimproved.

Case 11.—R. M., age forty-five years, was referred on April 18, 1918, by Dr. William J. Daly, with diagnosis of axial neuritis left with large central scotoma for colors. History of fair health and ability to work. Patient has had pain across the forehead and through the eyes for past three weeks. Expectorated a little bloody mucus in the morning. Eight months ago the sight of the left eye commenced to fail, and he visited the infirmary. His fundus was examined at that time by Dr. Worthen and reported as practically normal; vision 20/200. The fields were slightly contracted; no color scotoma. With the onset of pain the vision in the left eye has been much worse, everything now being blurry. In the region of the left posterior ethmoid there was considerable soft polypoid tissue, bleeding freely on touch. A most interesting phenomenon was noted: After thoroughly cocainizing this region, the slightest pressure with a cotton swab caused intense pain. Again this region was cocainized, yet the pain was in nowise lessened. This led me to suspect some more serious trouble than merely an infection in these cells, so I sent the patient to the infirmary for further examination. The X-ray by Dr. Liebman showed marked erosion in the sella turcica region; clinoid processes obliterated; ethmoids and sphenoids moderately obscured. This finding, of course, meant a malignant growth, so nothing was attempted in an operative way. The Wassermann and neurologic examinations were both negative. After being

under observation six days he was discharged unrelieved. One week later the patient died rather suddenly and his family physician, Dr. G. W. Blaisdell, of Manchester, Mass., wrote as follows:

"I saw Mr. M. on May 3d, at 2 p. m. He had had headache for the previous twenty-four hours. The headache was general all over the head. Temperature and pulse at that time normal. He was rational and answered all my questions. There was a slight protrusion of the left eyeball. The eye was painful to touch. All reflexes were normal. I saw him again at 7 o'clock. He was not as bright mentally. The left pupil failed to react to light. I saw him the next morning at 5 o'clock. He was then passing into coma. The reflexes of his legs even then were about normal. He died suddenly about two hours from that time, dying very easily without a struggle."

Dr. P. E. Meltzer of the infirmary kindly made the autopsy for me. His report is as follows:

"The usual technic was observed and calvarium was removed. Hemorrhagic areas were noted in the parietal region of the cerebral hemispheres, suggesting meningitis. No free pus or exudate was seen, but the sulci were infiltrated. On elevating the frontal pole, the most striking condition was noticed. Projecting upward from the sella turcica was a tumor about the size of an English walnut, which as it projected upward made quite an impression on the under surface of the brain just anterior to the chiasm. It was slightly adherent to the surface of the brain, but by careful manipulation it apparently separated intact and appeared pedunculated from the body of the sphenoid, in the pituitary region. The cranial nerves, particularly the optic, were removed for sections. In order to remove the tumor, it was necessary to remove practically the anterior and middle fossæ of the base of the skull. This was done, but the cellular condition of the nasal walls made this difficult. By carefully chiseling through the cribriform plate the roof of the orbits, the lesser and greater wings of the sphenoid and posteriorly through the basilar process a wedge shape portion of base of skull was removed, without disturbing materially the relations. The tumor and neighboring structures, posterior ethmoid cells were practically intact.

The brain and specimen were placed in 10 per cent formalin for purposes of hardening. Dissection later proved that the body of the sphenoid was practically entirely eroded."

Dr. Verhoeff, who examined the brain and new growth, reported as follows:

"Pathologic diagnosis: Large round cell sarcoma of sphenoid bone and hypophysis. Streptococcus meningitis. The specimens consist of the brain and the body of the sphenoid bone, together with the posterior portions of the ethmoids, including the optic canals. The sphenoid bone is almost completely pervaded by a tumor growth, which has either completely broken down or rendered the bony structure friable. The sphenoid sinus is filled by the growth, which has also broken through into the pharynx over a small area. The growth has extended into and greatly enlarged the pituitary body, but the capsule of the latter is still intact towards the brain. The chiasm is pressed upon by the enlarged pituitary body, but has not been invaded by the growth. The brain shows the typical picture of a diffuse purulent leptomeningitis. Histologic examination: The meninges show diffuse purulent infiltration containing an abundance of streptococci. Sections of a portion of the growth removed from the sphenoid sinus show it to be a large round cell sarcoma. The fixation is not sufficiently good to permit special stains being used.

"Sections of the pituitary body show that it has been almost completely destroyed by the growth, only a few parenchyma cells remaining here and there.

"Sections of the optic nerves and tracts prepared by the Merchi and Weigert methods, show no evidences of atrophy or degeneration."

He further says:

"As I remember the case, there was a central scotoma in one or both eyes. This is not inconsistent with the fact that I found no degeneration in the optic nerves, because there may have been simply functional blocking, capable of recovery could the pressure have been removed."

Case 12.—Mr. C. T. K., age forty-nine years, referred by Dr. F. E. Cheney on July 18, 1918, with diagnosis of unilateral retrobulbar neuritis of some months' standing. He has had considerable secretion in nose and throat for years. Four

months ago, following an unusually severe cold, the vision in the left eye suddenly became very poor, and there was severe pain through the head. Then something seemed to break in the back of his nose, and for a few days there was an offensive bloody discharge followed by complete relief from the pain. His vision, however, never completely returned. Dr. Cheney's report is as follows:

"An ophthalmoscopic examination showed a marked swelling of the left disc, about 3. D.; the borders completely obliterated, retinal veins moderately full and tortuous, and obscured at disc borders. There were a number of glistening cholestemic like spots on the disc, and the appearance of the disc as a whole did not suggest a recent inflammatory process. The borders of the right ear were completely obliterated and the disc elevation was about 1. D. The fields of vision were not contracted. Vision: Right eye, C. + 50 cyl. ax. 0 = 1; vision left eye, C. + .50 = .50 cyl. ax. 0 = 0.7. As I have said, the appearance of the left disc especially suggested an old rather than a very recent inflammation, and the trouble probably existed before his cold and nasal discharge in March."

The Wassermann was negative, as was also the neurologic examination by Dr. W. E. Paul. Patient does not use alcohol or tobacco to excess. A posterior deviation of the septum crowded the left middle turbinate so as to obstruct the sphenoid and posterior ethmoids. The tissues in this region were distinctly boggy, and mucopurulent secretion was seen about the middle turbinate. The X-ray plates made by Dr. Liebman showed: "Ethmoids: Left anterior and posterior obscured. Antrum: Right obscured. Sphenoid sinuses: Both rather hazy." On July 22, 1918, about four months after the onset of the neuritis, I removed the left middle turbinate and opened a posterior ethmoid cell, anterior to the sphenoid, which at first was thought to be a rather small, shallow sphenoid, but on further examination an opening leading into a good sized sphenoid was found. The sphenoid contained pus, was some 10 m. m. in anteroposterior diameter, with a thick anterior wall and soft tissues on the floor. There has been a gradual improvement in the vision. The blurriness no longer exists. Three months after the operation Dr. Cheney found

that vision in right eye was still normal and an improvement of 1/10 in the left, but there was no appreciable change in appearance of discs, and he thinks there may not be for a considerable time. Five months after the first operation the opening into the sphenoid, which had become quite small, was enlarged. This case is still under treatment, as the fundi are not yet normal.

Case 13.—Miss E. A. H., age forty-nine years, was referred by Dr. Thompson at the infirmary on December 16, 1918, with diagnosis of bilateral optic neuritis. History: Four months ago vision, which had always been poor, due to extreme myopia, began to be much worse. Has had severe pain in head for past fifteen years, but much worse the last six months and constant for the past four weeks, causing complete disability. Has sensation of severe pressure within the head. Six months ago the patient commenced to expectorate a thick mucus streaked with pus, and since that time has had intervals of marked temporary loss of vision. Pupils small and dilate easily; both discs irregular in outline and white on temporal sides, probably due to extreme physiologic cupping of both nerve heads. Nasal side of discs slightly accentuated. There was a marked deflection of the septum and hypertrophied middle turbinates. Physical, dental, neurologic, X-ray and Wassermann examinations all negative. Vision, 20/200 both. On January 3, 1919, the septum was resected, the right middle turbinate removed and the right sphenoid opened. It was very large and filled with a thick gelatinous secretion. For several weeks the patient was entirely free from headaches, and there was a slight improvement in vision, i. e., from 20/200 to 20/100, and enlargement of the visual fields. Then she complained of a feeling of discomfort with some pain on the left side, apparently above and behind the eye and extending to the back of the neck. On January 31st her left middle turbinate was removed, as well as the anterior wall of the left sphenoid. Reddened areas were found in the sphenoid but only a small amount of mucus. This case is still under treatment.

Case 14.—A. R., age five years, was referred by Dr. Spalding at the infirmary on January 3, 1919, with diagnosis of bilateral neuroretinitis. Child had influenza four weeks ago and for the past two weeks has acted as if he could not see; com-

plained of headache and had some vomiting. The fundi showed optic neuritis with stellate exudate changes in the macular region and dilated veins. Patient apparently does not even perceive light. Neurologic, physical, X-ray and Wassermann examinations all negative. There was a slight deviation of the septum high up, and both middle turbinates were greatly swollen, blocking the posterior ethmoids. For a week the turbinates were cocainized and the nose irrigated with a hot saline solution, as I hesitated to operate on such a young child. As there was no sign of a return of the vision, both middle turbinates were removed and the posterior ethmoids cleaned out—a difficult procedure, I assure you, in such a small nose. The following notes from the infirmary record show the progress of the case from day to day:

January 12th (two days after the operation): Lumbar puncture negative. Fundi show no change except possibly a more grayish tint to disc.

January 13th: Patient beginning to note shadows in front of him. Says he sees the light.

January 15th: Some improvement in vision.

January 17th: Patient walks about the room, avoiding large objects. Recognizes a watch. Nerve heads appear slightly less blurred.

January 20th: Vision improving; counts fingers at four feet.

January 27th: Less edema of retina. Still some swelling of optic nerve and white exudate in macula region but definitely less marked. Counts fingers at twenty feet.

February 13th: Improvement in fundi. Less edema of nervehead. Exudate in macula region definitely less.

February 15: Vessels of fundi of normal size.

February 18th: Discharged. Disc outline not distinctly made out. Some pallor of discs. White patches in macula region much smaller. Counts fingers at twenty feet and picks up pins from floor. Vision apparently normal.

Case 15.—J. K., age thirty-seven years, was referred to me from the eye clinic of the infirmary on February 6, 1919, with diagnosis of bilateral papillitis. History: A month previously while at work his right eye was struck with a fragment of eyeglass or the piece of steel that broke the glass. Vision for fingers at one foot, left; 20/40 right. Dr. Quackenboss saw the pa-

tient on February 14, 1919, and noted a marked double optic neuritis. Both discs were indistinct in outline, the left more so than the right, but no swelling made out. Physical, neurologic and Wassermann examinations negative. X-ray showed right antrum and posterior ethmoids obscured. Sella turcica unusually large in anteroposterior diameter, but probably not pathologic. The left middle turbinate was removed and the sphenoid and posterior ethmoid opened. The sphenoid was filled with pus under some little pressure. The patient developed an acute frontal sinusitis ten days after the operation, but the eye conditions improved somewhat. Two weeks after the operation Dr. Quackenboss noted the left disc stood out more clearly and the edges more distinct. On March 24th the discs still showed some slight hyperemia. Vision, right 20/20; left, fingers at two feet. Question of malingering, as the patient was contemplating bringing suit for damages against the company he worked for when he had his glasses shattered. A secondary operation was advised but refused.

Case 16.—S. D., age forty years, was referred by Dr. E. T. Easton with diagnosis of unilateral optic atrophy. History: About three years ago he noticed that there was a constantly present blue spot in front of the right eye and that everything was blurry. Under constitutional treatment this cleared up in about three weeks and for a year the vision was normal. Then there was a recurrence of the trouble, and in spite of treatment by specialists near his home and at the New York Eye and Ear Infirmary, vision has been going from bad to worse. When seen by Dr. Easton on February 12, 1918, the vision in the right eye was 20/50; pupil rather dilated but reacted well; disc slightly pale; fundus otherwise normal; central scotoma for red, green and blue. When next seen by Dr. Easton on February 13, 1919, vision had dropped to 20/200. Patient was referred on his first visit to Dr. Easton to the Eye and Ear Infirmary and admitted as a house case on February 19, 1918. Diagnosis: Optic atrophy right. The X-ray of sinuses, Wassermann and neurologic examinations all negative. Patient was first seen by me on February 20, 1919—i. e., one year later. There was marked deviation of the septum to the right, and the middle turbinate was tightly wedged between it and the outer wall. Eight days later I removed his right middle

turbinate, opened the sphenoid and posterior ethmoid. The mucous membrane lining these cavities was considerably thickened, quite evidently a case of hyperplasia. Two months after the operation Dr. Easton reported as follows: "Mr. D. shows improvement in vision in right eye from 20/200 to 20/100. The disc shows no increase in pallor."

Case 17.—Mrs. R. D., age thirty-one years, was referred by Dr. Henry Hawkins on March 21, 1919, with diagnosis of bilateral retrobulbar neuritis; vision, right 20/30; left 20/100; papillitis of each disc, general edema of retina. History: Frequent colds during the past winter but vision not affected until six days ago, when she noticed that everything seemed foggy. This fogginess has been getting worse, and she complained of a blind spot in the center of her visual field. She has had considerable pain about the eye and back of the neck, extending down to the shoulder blades. Both middle turbinates were greatly hypertrophied, the left the most marked and especially obstructing the sphenoid. Immediate operation was advised. On the following morning the left middle turbinate was removed and the sphenoid and posterior ethmoid opened. The sphenoid was of enormous size, extending over an inch beyond the median line to the other side. The lining was boggy, and the posterior ethmoid cell large and high. The sphenoid was irrigated daily with a hot saline solution. The discomfort about the eye and the pain in the head were immediately relieved. Vision returned rapidly, so that on April 10th, three weeks after the operation, Dr. Hawkins reported: "Right eye with proper correction, 20/20; left, 20/30; fundi little change from normal conditions." Two weeks later, eyes 20/20 both.

This last case illustrates how quickly results are obtained by prompt operative interference, and I believe is the method of procedure to be followed in all obscure cases. Is it not infinitely better to promptly open the posterior accessory sinuses, sometimes perhaps unnecessarily, than to allow one of these cases to become permanently blind through neglect?

SUMMARY.

Of the seventeen cases here reported, two were not operated upon (Cases 1 and 11). In one the eye remained permanently blind, while in the other the patient died from a sarcoma.

Of the fifteen operative cases, all but one improved (Case 10). In this case the eye had been practically blind some months, and the operation was undertaken to determine what effect, if any, the opening of the sphenoid would have on the dilated veins of the fundus.

Normal vision was obtained in seven (Cases 2, 3, 5, 7, 8, 9 and 17).

There was marked improvement in three (Cases 6, 12 and 14), but some optic atrophy.

Only slight improvement in four (Cases 4, 13, 15 and 16), this being due to the chronic nature of the disease and the delay in operating. In all these an early operation would have saved much more of the vision.

The toxemia from the pus found in seven cases seemed the chief factor (Cases 1, 4, 9, 10, 13 and 15).

In eight, hyperplasia appeared the predominating lesion (Cases 2, 3, 5, 6, 7, 8, 16 and 17).

In two cases pressure apparently played the leading rôle (Cases 11 and 14).

In seven, the nasal examination was negative (Cases 2, 4, 5, 7, 8, 9 and 10).

In six cases the X-ray findings were positive (Cases 2, 3, 4, 11, 12 and 15). Negative findings, however, by no means contraindicate an operation.

The middle turbinate was removed in all the operated cases and the sphenoid opened in all but one (Case 3). The posterior ethmoid cell is at present opened as a matter of routine. Unless suspected of infection, the other ethmoid cells are not disturbed. The complete exenteration does not in most cases seem necessary. The Sluder technic of removing the middle turbinate and opening the sphenoid is followed. In practically all cases Wassermann and neurologic examinations were made and the teeth investigated.

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XXXIX.

TONSILLECTOMY UNDER LOCAL ANESTHESIA.

By George B. Jobson, M. D.,

Franklin, Pa.

After an experience of 325 cases of tonsillectomy operated upon under local anesthesia (or, more properly, analgesia), I am convinced that it is the method of choice in most adult cases, and a great many selective cases in children over twelve years of age.

The ages of the cases recorded ranged from eight to fifty-five years. The loss of blood was almost nil, the largest amount being not over two ounces, while in the majority of cases the operation was practically bloodless. In only one case was there delayed hemorrhage, which was brought about by forcible clearing of the throat an hour after the operation. In this case, the hemorrhage, which came from the venous plexus at the base of the tongue, was readily controlled by compressing with gauze, impregnated with glycerite of tannin. In no case was there secondary hemorrhage. In 75 per cent of the cases the operation was painless; the remainder complained of slight pain during the momentary compression of the snare wire.

The "after-pain" was no more severe than that which follows a tonsillectomy under a general anesthetic. And convalescence was shorter than when a general anesthetic is used, as the shock consequent upon the latter was absent.

The technic of the operation does not differ very materially from that followed by many operators, except in the method of injecting the anesthetic solution, but this is one of the principal factors in bloodless and painless tonsil enucleation.

In preparation for the operation, a sufficiently thorough general examination should be made to assure knowledge of the functioning power of the heart, lungs and kidneys, and to note the coagulating power of the blood. If coagulation time of the blood (7½ minutes) be above normal, calcium lactate is

administered in 15 grain doses t. i. d. for three days before the operation. Hemophilia should be ruled out as far as possible, by the history. It is better not to remove the tonsils of women and young girls when menstruating, as they are more liable to bleed at that time. Operation should not be performed upon a tonsil that is acutely inflamed or when there is any sore throat.

Half an hour before the operation a hypodermic is given, or 1/6 grain of morphin and 1/150 grain of atropin. The atropin diminishes the amount of secretion in the throat and counteracts the effect of the cocain which is used in swabbing the throat.

The tonsils, pharynx, soft palate and base of the tongue are painted with an 8 per cent cocain solution at intervals of two or three minutes, for three or four applications.

The tongue is depressed with a Pynchon depressor in the hands of an assistant, care being taken that the base of the tongue on the side to be operated upon is pressed downward and forward by tilting the end of the depressor blade downward and slightly toward the tonsil to be removed.

The tonsil is grasped very firmly at its upper and lower poles by forceps which will not loosen or tear out. For this purpose I have devised a modification of Tyding's forceps with saw shaped teeth, set at an obtuse angle. These teeth are forced deeply into the tonsil, and engage the fibrous trabecula, thus giving a firm hold. The forceps have a strong locking device. Then, after being grasped securely, the tonsil is drawn firmly toward the median line, so as to raise the gland from its bed (fossa tonsillaris) and to render the faucial pillars taut. The space between the tonsil and superior constrictor muscle, which is made by tension on the tonsil, is flooded with from 2½ to 3 drams of a ½ per cent solution of procain (novocain) solution or one of its substitutes, to which is added a few drops of 1:1000 adrenalin solution.

Caution should be used in the administration of such a potent remedy as adrenalin, for I am inclined to believe that some of the harmful results attributed to cocain or its substitutes may be due to the action of adrenalin when used in combination. The idea in flooding the tonsillar fossa is to force the superior constrictor muscle away from the tonsil; and

with it, the tonsillar, ascending and descending palatine arteries which course along the outside of the muscle, before they supply numerous small twigs to the outside of the gland.

This hydraulic dissection not only lessens the danger of cutting large vessels, but many branches of nerves entering the tonsil are reached more effectually than by injecting at certain points. Again, the small arterial tonsillar branches which pierce the superior constrictor are blocked off by the adrenalin.

The technic of injection is to insert a long needle of a Pynchon or other syringe through the base of the taut anterior faucial pillar until the space behind the tonsil is encountered, when a portion of the solution is injected. The needle is withdrawn, and the operation is repeated at three points, from the upper to the lower ends of the anterior pillar. A few drops of solution should also be injected into the peritonsillar fossa at different points, to enhance anesthesia, by blocking the nerve plexus known as the circulus tonsillaris. About ten minutes should be allowed for the action of the anesthetic, when the tonsil is grasped as before, and drawn firmly toward the median line. The taut anterior pillar, with the plica triangularis bridging it to the tonsil, may be outlined. The plica is carefully separated by nicking it at the upper third of the tonsil with a Day angular tonsil knife and, with the flat surface hugging the tonsil, and cutting edge forward, the incision is prolonged into the anterior tonsillar fossa, and continued downward in this fossa to the inferior tonsil pole. The knife is reversed and the plica separated, from the original incision to the posterior part of the supratonsillar fossa. Care should be taken not to cut into the anterior pillar or the tonsil. This is not difficult, if the tonsil is kept on the stretch when the knife is being used.

Cutting the anterior pillar endangers the dorsalis lingual artery, and mutilation of the gland makes it difficult to do an intracapsular operation. If further separation of the tonsil is desired, a dull dissector or back of the knife may be used, after separation of the plica. On no account should separation of the posterior pillar (which contains a branch of the ascending pharyngeal artery and a large vein) with a knife or dissector be attempted, as the snare will peal the tonsil from the

posterior pillar without danger to its vessels better than by dissection.

The tonsil having been freed from its supratonsillar and anterior pillar connections, a number eight snare wire is slipped over the locked forceps and pulled down to a size that the tonsil will about fill. This loop is insinuated back of the tonsil, with canula at the anterior and upper third of the gland; with quick pressure the tonsil is enucleated, and drops out in the grasp of the locked forceps. The fossa tonsillaris is swabbed with glycerite of tannin to further seal the vessel mouths. The patient is returned to his room, propped up in bed at an angle of forty-five degrees, and given pellets of ice to dissolve in the mouth for the relief of the after-pain.

XL.

GANGRENE OF THE TEMPOROSPHENOIDAL LOBE, RIGHT SIDE, OF OTITIC ORIGIN—OPERATION AND EXTENSIVE EXCISION OF THE LOBE —WITH RECOVERY.*

By James F. McCaw, M. D.,

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The following case of chronic suppurative otitis media and gangrene of the temporosphenoidal lobe of the brain is such an unusual pathologic condition that we feel justified in placing it on record by reporting it before this society. The patient, a male, age twenty-eight years, was brought to the Watertown City Hospital by his family physician on August 17, 1914, with a history of having had a purulent discharge from the right ear for twenty years.

His previous history revealed the fact that he had been a worthless, irresponsible, irritable, cruel fellow for years. He would do queer things so often that his family and neighbors had come to look upon him as not mentally balanced—in fact, he was always considered of very low mentality. After his marriage he would wander away from home and be absent for several weeks without his family knowing his whereabouts. He would get up at night and go out to the barn and sleep in the hay mound; he would treat his infant son cruelly, and he would do many other such unusual things as to be stamped by his fellow man as a moral and mental pervert.

The chronic purulent otitis media had existed for twenty years, with acute exacerbations from time to time, with great pain and discomfort lasting for several days, followed by increased discharge with relief of symptoms. On admission to the hospital he had been suffering from one of these exa-

*Read before the American Otological Society at Atlantic City, N. J., June 16, 1919.

cerbations for two weeks, with gradual increase of symptoms; he complained of severe general headache as well as pain referred to the right ear, mastoid area, temporal region and chest, occasional nausea, and vomiting of small amounts of a greenish fluid, attacks of profuse perspiration and twitching of the facial muscles of the right side. He had lost considerable flesh.

Examination: Patient dull and apathetic; lies in a stupor unless aroused, but when aroused answers questions slowly and correctly but resents too much annoyance. The sensorium is exceedingly lowered in tone when undisturbed but heightened when annoyed by the examination. There was no muscular paralysis, but occasional convulsive movements of the facial muscles of the right side. Aphasia was absent, as would be expected, the lesion being on the right side. Ophthalmoscopic examination showed a dilated and immobile pupil with choked disc on the right side, and blurring of the left disc. The right auditory canal was filled with foul smelling pus, tympanic cavity filled with cholesteatoma and there were necrosis of the ossicles and roughened bone in the attic, marked swelling and edema over the entire mastoid area, extending above the auricle and well forward over the temporal region. Extreme tenderness to pressure over the same areas. Temperature, 99°; pulse, 76; respirations, 26. Urinalysis, specific gravity 1030, trace of albumen and a few hyalin casts. Differential blood count gave a leucocytosis of 12,000, polynucleosis 82 per cent. After the ordinary preparation the patient was operated upon the following day. The usual mastoid incision was made and flaps elevated. The external table of bone looked somewhat dark. On removing this and opening into the mastoid antrum there was a gush of greenish, exceedingly foul smelling fluid, rising about two to three inches above the wound surface; there was about three to four ounces of this fluid evacuated. While there was very little free pus to be seen, the entire bony structure of the mastoid was necrotic and soft. A complete radical mastoid operation was done.

The infection was found to have gone through the tegmen antri, which was necrotic. The dura was uncovered at this point and was found to be of a dark greenish, gangrenous appearance. My incision was then extended forward over the

auricle and well into the temporal muscle; these flaps were elevated, and with rongeur forceps the bony tables of the skull were removed over a corresponding area. The dura over this entire field was found to be in the same greenish, gangrenous state.

Upon free incision of the dura and exposing the brain tissue beneath, it was found to be in the same condition of degeneration. With forceps and scissors the greater portion of the temporosphenoidal lobe was cut away. It was of the consistency of soap and of a greenish, gangrenous condition throughout. There was no bleeding during this procedure. We purposely did not go into normal brain tissue for fear of opening up channels for further extension of the infection, but after removing as much as we felt warranted, and separating the surfaces so as to get a view toward the center of the brain we could see a shining, glistening membrane which was thought to be the lateral wall of the lateral ventricle, and forward we could see and touch the posterior margin of the greater wing of the sphenoid. The distance by actual measurement was three inches directly inward and three and one-half inches forward from the surface of the wound. This wound was left open and loosely packed with iodoform gauze except for two sutures in the temporal region. The patient stood the operation exceptionally well, and at no time did he need stimulation. He was sent to bed and made an uneventful recovery.

Contrary to the usual teaching, my first dressing was not disturbed until the fifth day, and then it was taken down, the wound cleaned and repacked. This was repeated every second day thereafter. His pulse was never below 64 and that before operation. After operation, it was never below normal. The temperature, which had reached 102° before operation, never reached that point afterwards, and was gradually seeking a lower plane until it became flat on the seventeenth day following the operation.

Considerable pain in the head was complained of for about two weeks, which had to be controlled by morphin. A fair sized cerebral hernia developed, but in the contraction of the wound due to the healing process the greater part of it was taken care of. About two months after the primary opera-

tion the wound was nothing more than a clean granulating surface with a small cerebral hernia, about one-half inch in all diameters, situated in the region of the tegmen antri. A plastic operation was now done to give support to the hernia and close the wound. The flaps were elevated thoroughly and the entire wound lightly curetted. A flap was fashioned from the posterior flap of the mastoid wound, including the periosteum and overlying tissues except the skin, cut free at its lower part, carried upward and forward and sutured to the periosteum at the upper and anterior part of the wound. This flap acted as a suspensory and covering to the hernia, giving it support. Another flap was made from the posterior auditory canal so as to enlarge the meatus, and this was carried upward and backward, being sutured to the upper part of the posterior wound flap, thus giving further support to the hernia. The wound was then closed and iodoform gauze carried in through the meatus and the entire cavity lightly packed. The wound healed by primary union and the patient left the hospital eight days later.

Subsequent history: The radical cavity had completely healed and was dry about six weeks after leaving the hospital. The patient's mental condition gradually improved, and I heard, through his employer about one year ago, that he was at that time a very good worker, trustworthy and dependable, had lost all of his former traits and was a real good citizen. There was no paralysis detectable, and his mental and physical condition remains excellent.

To me there are several points of extreme interest in this case.

1. It shows to what extent the brain can be involved in a pathologic process without a fatal issue, and also the length of time such a process can be present without giving pronounced pathognomonic cerebral symptoms.

2. It also illustrates the great tolerance of the brain to operative interference, providing we do not go through healthy tissue in attacking the pathologic process or go beyond the limits of the same, opening up fresh channels for an extension of the infection. This is especially true in chronic conditions, for in these cases nature has already protected herself by walling it off from the general cavity, and if we do not heed

nature's efforts, but break down these barriers, we are jeopardizing the welfare of our patient.

3. The absence of free pus, none being found in any region. The infective agent must have gradually interfered with the blood supply to the temporosphenoidal lobe with final death of tissue. We conclude this from the fact that at the time of operation, while freely cutting the lobe away, there was no bleeding.

4. The very marked improvement in the patient's physical, mental and moral status. From a mental and moral pervert he is restored to the community as a reliable and fairly good citizen, capable of earning his own living, whereas before he was partly a county charge.

5. The complete absence of any untoward symptoms following the operation and a gradual, progressive and uneventful recovery. The pulse rate remained practically normal in the face of extreme intracranial pressure.

6. My method of closing and giving support to the cerebral hernia by reinforcing its covering by two flaps before closing the mastoid wound was most gratifying in its results, as it gave a firm, solid retaining wall to the hernia which had remained so until the last time I saw the patient, about a year after operation.

XLI.

REPORT OF A CASE OF SARCOMA OF THE PHARYNX.*

By William C. Bane, M. D.,

Denver.

In the Transactions of the American Laryngological Association for 1915, Dr. Ralph Butler, in connection with an excellent report of a case of sarcomatous tumor of the pharynx, has ably reviewed the literature and given a bibliography. I have therefore refrained from a repetition and will confine myself, in this paper, to a report of a case coming recently under my care.

On September 26, 1918, Louis K., a lad of thirteen years, was referred to me by his physician on account of pain in the right ear. Five weeks previously this ear had given the boy pain lasting for seven days, not returning until the night before I was called into consultation. During the previous two weeks there had developed a swelling below and in front of the right ear.

Examination revealed the following: Hearing with the right ear, watch on contact; with the left ear, watch, 60/60. The right ear was not tender to pressure, the external auditory canal was free, and the membrana tympani was free from congestion, but somewhat dull and moderately retracted. The right parotid gland was swollen, with induration of the lymph glands at the angle of the jaw on the same side. Upon opening the mouth there was manifest the typical appearance presented by a peritonsillar abscess. The right tonsil and the surrounding tissues were swollen and tender, the swelling extending back of the posterior pillar and above the arch. The left side of the throat appeared quite normal.

As the patient was somewhat stubborn and difficult to handle, he was sent to the Children's Hospital, where at 4 p. m., September 27th, he was given a general anesthetic, and a search

*Read before the American Laryngological, Rhinological and Otological Society in New York City, June 6, 1919.

was made for a pocket of pus external to the right tonsil. The dissection was extended until the tonsil was enucleated, and a free opening was made with forceps into the swollen retropharyngeal tissues, yet with neither operation was any pus evacuated. A great deal of difficulty was experienced in keeping the patient from suffocating, so that it was necessary to keep his tongue drawn forward for several hours. Two days following the tonsillectomy the swelling in the right side of the pharynx was much increased, and to inspection and palpation was suggestive of abscess formation. A free opening, however, evacuated only blood and serum. Inasmuch as malignancy was not suspected, the tonsil was not saved for laboratory examination.

During the next ten days a course of tonics and stimulants was given, without much result. Very little food was taken, due to the difficulty in swallowing, as well as loss of appetite. The temperature varied from 100 to 105 degrees F., and the pulse from 120 to 160. Two doses of antistreptococcic serum were administered, ice poultices applied to the neck and head, and the throat kept clean with a spray of antiseptic solution containing adrenalin. At the end of three weeks the infiltration of the tissues of the right side of the pharynx had disappeared somewhat, yet there remained a decided irregular induration of a semisolid nature. Inasmuch as the lad kept his neck quite stiff, and suffered pain when the head was moved to its normal position, an X-ray was taken of the cervical vertebræ, but it revealed no caries.

During the fourth week theer was manifest some induration and tenderness of the anterior cervical glands on the left side. This was not lasting, but at the same time the enlargement of the right anterior cervical glands increased and remained enlarged, varying slightly in size from time to time. About the seventh week there appeared a drooping of the right upper eyelid, and upon examination there was revealed an elongated, reddish, glandular mass in the outer canthus and under the lid, which to palpation seemed to be connected to the lacrimal gland.

The dyspnea and the dysphagia gradually increased, and became so distressing that finally, on October 28th, in consultation with Dr. Shere, I again perforated the mass in the

pharynx, but only a slight showing of blood and serum escaped. A small piece of this mass was excised and later examined by Dr. Helen Craig. She suspected malignancy, but the specimen was too small for her to make a positive diagnosis. On December 3rd, Dr. Lockard saw the patient with me in consultation. On December 9th, Dr. Shere removed a lymph gland from the right side of the neck under local anesthesia. This was examined by Dr. Craig, who reported as follows: "Sections from the gland, removed from the neck of L. K., reveal the lymph gland invaded by round cells with large irregularly staining nuclei. Most of the lymphoid tissue has been replaced by these cells. Diagnosis: Large round celled sarcoma."

The lad was admitted to Schlessinger's radium laboratory, where he was given two treatments, on December 30th and January 13th. Dr. Shere observed a marked relief after the first treatment, in that the boy could swallow easier, had a better appetite, and that there was a decided shrinkage in the enlargement in the pharynx. However, this apparent improvement in the symptoms was only transient, for the lad grew gradually weaker and soon developed still greater difficulty in breathing and swallowing.

Three weeks before the boy died, on February 2nd, besides the symptoms detailed, a severe cough developed, which was believed to be due to metastases in the chest. Unfortunately, an autopsy was not permitted. Numerous nodules, about the size of a large bean, were noticed on the chest wall, while two were found in the right axilla, and one in the right breast, about the size of a crabapple. During this period the growth about the right eye also increased in size quite rapidly, pushing the eyeball forward and to the nasal side so far that the lids would not cover it, and the patient complained very much of pain about the eye and head.

There was obtained a history of an automobile accident about a year ago, in which the boy received an injury to the right side of the head and neck, but whether this had anything whatever to do with the development of the sarcoma is very doubtful, although traumatism has an important place in the etiology of sarcoma.

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XLII.

DIGEST OF AMERICAN AND ENGLISH OTOLOGIC LITERATURE FOR THE YEAR 1918.

By Otto M. Rott, M. D.,

Spokane, Washington.

I.—Hearing Tests.

1. Brownfield, R. R.—Detection of Pretended Loss of Hearing with Special Reference to Unilateral Deafness. Jour. A. M. Ass., Chicago, 1918, LXX, 597.
2. Callahan, J. F.—Hearing Test to Detect Malingering. Boston M. & S. J., 1918, CLXXIX, 236.
3. Callahan, J. F.—Hearing Test with Voice to Detect Malingering. Boston M. & S. J., 1918, CLXXIX, 423.
4. Gradenigo, D.—The Unit of Sound. Stefanini's Phonometer with Ball and Sounder. J. Laryngol., Lond., 1918, XXXIII, 197.
5. Kerrison, P. D.—The Tests for Malingering in Defective Hearing. Laryngoscope, St. Louis, 1918, XXVIII, 662.
6. Mollison, W. M.—A Note on Schultze's Monochord. J. Laryngol., Lond., 1918, XXXIII, 365.
7. Prenn, Joseph.—Hearing Test Apparatus. Boston M. & S. J., 1918, CLXXVIII, 896.
8. Teal, Frederick F.—A New Ear Test for Malingering. Laryngoscope, St. Louis, 1918, XXVIII, 615.

Brownfield offers a device for detecting malingering, in which device batteries and make-and-break contacts are entirely dispensed with. The ordinary 110 volt alternating commercial lighting current is used. The variable current is produced by a potentiometer, and is variable from an absolute zero to maximum. No vibrating iron is used, and the maximum strength of current employed is dependent on no factor except the ratio of the electrical resistances employed. The sound producer is similar to a telephone receiver except in one very important respect—the core is of soft iron and is not magnetized. This results in eliminating the variability due to demagnetization and doubles the pitch, so that the ordinary 60 cycle current produces 240 vibrations per second—about equal to the average tone used in conversation.

The sound producer is provided with three lugs to hold it away from the ear, so that the sound will be transmitted solely by air conduction. By simply turning the indicator from 100 to zero, one can cause the sound to increase from the point at which it is just perceptible to one of normal hearing, the threshold of audition, or 100 per cent acuity, to a degree of intensity at which failure to perceive it indicates that the subject has no practical hearing. In addition to the variable receiver, there is a supplementary one that always operates at maximum intensity, irrespective of the loudness of the other.

In the usual test for the acuity of hearing, only the variable receiver is used. As the subject holds this to the ear, the pointer is gradually moved from zero to the 100 point. As the intensity of the sound gradually increases, he is told to indicate the point at which he is no longer able to perceive it. This point is noted, and the movement of the pointer continued still farther. The direction is then reversed and the subject directed to indicate the point at which the sound is again heard. After one or two trials, the various readings will be found to harmonize quite closely unless one has a case of malingering, which may be readily detected by inconsistency of the readings. It is hardly necessary to remark that the electric control has a distinct advantage over the watch and whisper tests, as the malingerer is totally unable to guess what reply would be expected from one of defective hearing. The only precaution necessary is to place the instrument back of him. A small push button is provided, which may be used to disconnect the receiver, in case the subject is uncertain whether he hears the vibrations or is confusing it with tinnitus.

The application of the instrument consists in having the patient hold the constantly loud receiver over the alleged deaf ear, and the variable receiver over the other. Starting with the pointer at 100 (minimum sound), it is gradually moved toward zero and the subject directed to state when he first hears the sound in his good ear. If he really suffers complete loss of hearing in one ear, as claimed, the presence of the loud receiver will not disturb him or interfere with the perception of sound by the other ear; in fact, it might just as well be disconnected. Under this presumption he would have

no difficulty in clearly detecting the sound in the other ear, and we would soon have a proper index of its acuity. If, however, he is merely pretending and actually has a very fair degree of hearing in both ears, it would be absolutely impossible for him to identify any sound whatever in his good ear, to which the variable receiver is applied, until a point on the scale is reached that would normally indicate very defective or almost no hearing for the good ear.

The very nature of the test facilitates the detection of fraud, because the better he can hear in the alleged defective ear the less will he hear in the other—a condition just the opposite of what he might expect; and so when he makes his usual negative reply he is for once telling the truth and trapping himself.

Callahan's test to detect malingering is based on the fact that tuning forks vibrating with the same pitch and loudness one inch from each ear are heard in each, but that if the fork at the left ear is removed to a point three inches from the ear, this sound is lost and only the fork remaining at one inch from the right ear is heard. If now the one at the right ear is removed six inches from the ear, it will no longer be heard; but the left one, formerly not heard, will again become audible. Similar results were obtained if the fork was placed against a rubber tubing.

For this test the author uses a seven foot length of rubber tubing, hole 3/16 inch, diameter of wall of tubing 6/16 inch, to either end of which is attached an aluminum funnel. The funnels are held to the ears and about one inch away from them by a simple attachment on the headrest of the examining chair, which allows of adjusting them to cover the ears without touching the patient.

The 256 C1 fork is heard by the normal ear, when placed against the tubing at any point up to 7½ feet. With a larger sized tubing the same fork is heard as far away as 30 feet.

The application and results in an individual with two normal ears are as follows: The seven foot tube is connected with one funnel, the latter being placed about one inch from the right ear. The tuning fork vibrating is applied to the tube about six inches from the ear and moved along the tube away from the ear until it is no longer heard. This will usually be about seven to seven and one-half feet. The tube is now

disconnected from the right funnel and attached to the left, and the same procedure followed. If normal, the left ear will also hear the sound of the fork transmitted along the tube up to seven feet or more from the ear. Now the tube is attached to both funnels. The vibrating fork is applied to the tube one foot from the right ear and moved along the tube away from the right ear and toward the left ear. It will be heard only in the right ear until it reaches a point about three to three and one-half feet from the right ear, at which point it will be heard also in the left ear, and will continue to be heard in both ears for a distance of about four inches in the middle of our 7 foot tube. It is this space of about 4 to 6 inches in the middle of the tube that is called "the neutral space." The sound in this neutral space almost imperceptibly disappears from one ear to appear in the other, and in this space there is some doubt in the patient's mind in which ear he hears the fork. As the neutral space is passed through, the sound becomes perceptible in the left ear and is not heard in the right. It is to be noted well that whereas the right ear heard the tuning fork up to 7 feet in the first part of the test, it now loses the sound of it along the same tubing at about 3½ feet, because in this second instance the other end of the tubing goes to the left ear, and as the tuning fork passes from the right half of the tubing through the neutral space to the left half of the tubing, the sound is heard in the left ear alone. The detection of feigning now becomes practicable if it takes the form of misstatements concerning the hearing in one ear.

The detection of malingering is illustrated by the following case in which total deafness in the right ear was claimed: With the long "one ear" tube connected with his left ear it was found on several tests that he heard the fork up to 7½ feet from the ear. With the same tubing connected with the funnel for the right ear, he persistently held that he did not hear it even at 4 inches from the ear. The tube was then connected with both funnels and the tuning fork started at the left—good—ear. He admitted hearing the sound in the left ear until we reached a point forty inches from the left ear, when he said that he could not hear it. From this point onward up to 4 inches from his right—bad—ear, he claimed not to hear the sound. The tuning fork was then placed over

the coupling in the tube—this point being 14 inches from his right ear and 70 inches from his left. He said he did not hear it. The coupling was taken apart and the fork again touched to the tube at the same place where he had just said he heard nothing, viz.: 70 inches from the left ear on the end that went to the left ear, and he said he heard it in his left ear. He was caught, for if his right ear had been deaf, he would have heard the sound in his left ear at this point and at every other point up to 84 inches from his left ear while the tubing was still connected with both funnels. He reported not hearing the sound to the right of the neutral space because he was determined to give a negative answer whenever he heard the sound in his right ear.

Callahan also uses the voice to detect malingering with the same apparatus used for tuning forks, with the exception that as a mouthpiece an ether cone is used and this connected to the two pieces of tubing.

Gradenigo describes a modification of Stefanini's phonometer, an instrument for rendering a standard sound unit for testing the hearing.

Kerrison describes the tests for malingering in defective hearing which he has employed in connection with the examination of drafted men. The tests, upon the continued results of which he bases his conclusions are: (1) Weber's test; (2) the loud conversational voice test; (3) the binaural stethoscope test; (4) tests eliciting incongruous variations in response; (5) the noise apparatus-reading test (Lombard's test).

Mollison describes the monochord and endeavors to establish its claims over the Edelmann-Galton whistle, in determining the upper tone limit of the ear.

Advantages are:

1. It is easily standardized.
2. It is simple to use.
3. By placing the support of the wire on the mastoid process the upper tone limit through the bone can be tested.

Prenn's hearing test apparatus consists of two rubber tubings, one to each ear, and the other ends connected with a funnel through which the whispered voice or tuning fork vibrations are made to pass. This is the same in principle as that described by Callahan.

Teal proposes a new ear test for malingering, in cases of unilateral catarrhal deafness. The patient is blindfolded and the air conduction tested and is found to be negative. The Weber test is then used and usually (though reluctantly) he hears the fork in the deaf ear. Bone conduction over the mastoid is next tested and again he admits hearing the fork. He is then commended for his answers and assured that he answered as he should. The last and real test is now used. After saying that the last test (bone conduction) is to be repeated, the examiner places a nonvibrating fork (or lead pencil) over the mastoid and at the same time brings a vibrating fork close to the auricle. If the patient is malingering, he will answer that he hears the fork (thinking that he hears through the bone as before) and the fact of a normal path of air conduction is established. If he is really deaf he will, of course, not hear the vibrating fork.

A Hartmann "C" fork is used.

II.—Vestibular Tests.

1. Carpenter, E. R.—Value of the Neuro-Otologic Tests in the Army from a Diagnostic Standpoint. Jour. Am. M. Ass., Chicago, 1918, LXXI, 899.

2. Culbertson, L. R.—What Is the Cause of Defective Orientation or Equilibration? Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 187.

3. Fisher, Lewis.—The Method of Analysis of the Barany Tests in Pathologic Cases. Laryngoscope, St. Louis, 1918, XXVIII, 724.

4. Fisher, Lewis, and Lyman, H. W.—The Ear in "Stunt" Flying. Jour. Am. M. Ass., Chicago, 1918, LXXI, 1977.

5. Graef, Chas.—Vertigo. N. York M. J., 1918, CVII, 241.

6. Graef, Chas.—Some Points of Interest in Tests of Labyrinthine Function. Laryngoscope, St. Louis, 1918, XXVIII, 811.

7. Hastings, H.—Reactions of the Normal Labyrinth. Recent Experience in the U. S. Aviation Examination. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 481.

8. Heitger, J. D.—The Application and Interpretation of the Newer Ear Tests. J. Indiana M. Ass., Fort Wayne, 1918, XI, 135.

9. Jones, I. H. Value of Routine Examination of the Labyrinth. N. York M. J., 1918, XVIII, 167.

10. Ibid.—The Value of Ear Examination to the Neurologist. Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918, XXVII, 881.

11. Ibid.—An Attempt at Simplification of the Physiology of the Vestibular Labyrinth. Laryngoscope, St. Louis, 1918, XXVIII, 472.

12. Lemere, H. B.—Oculomotor Reaction to Labyrinth Stimulation. Jour. Am. M. Ass., Chicago, 1918, LXXI, 901.

13. Lewis, E. R.—Influence of Altitude on the Hearing and the

Motion Sensing Apparatus of the Ear. Jour. Am. M. Ass., Chicago, 1918, LXXI, 1398.

14. Parsons, R. P., and Segar, L. H.—Barany Chair Tests and Flying Ability. Jour. Am. M. Ass., Chicago, 1918, LXX, 1064.

15. Robertson, Chas. M.—Examination of Men Entering the Aviation Service. Jour. Am. M. Ass., Chicago, 1918, LXXI, 813.

16. Scruton, W. A.—Examination of Applicants for Aviation Service, U. S. Army. Disqualfying Factors in 1,500 Cases. Some Observations of Past-Pointing After Rotation. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 528.

17. Stimson, G. W.—The Static Labyrinth. N. York M. J., 1918, CVII, 539.

18. Swan, C. A., and Lake, R.—The Results of a Series of Investigations Based on Examination of 110 Individuals, with Regard to the Time of Commencement and Duration of Nystagmus in the Caloric Test. J. Laryngol., Lond., 1918, XXXIII, 118.

Carpenter illustrates with a case report the value of the vestibular tests in making the diagnosis of multiple sclerosis of the cerebellar type, inasmuch as in this instance it involved chiefly the region open to examination by the Bárány tests. The author quite naturally concludes:

1. A more general use of the tests is indicated when dizziness is encountered.

2. A closer cooperation of the otologist with the neurologist is necessary in this work.

Culbertson advances the hypothesis that the labyrinth when not plumb with the vertical or horizontal plane of the body or the horizon might cause defective orientation or equilibration.

Fisher discusses the method of analyzing the Bárány tests, in order to determine (1) whether the lesion is functional or organic; (2) if organic, whether the lesion is central or peripheral; (3) if central, where the lesion is located.

A functional condition may be suspected only if all responses are normal. A definite impairment of even one response points to an organic lesion.

As to differentiating between a central and peripheral lesion, the following principles are important:

1. In a peripheral lesion all the responses are impaired, and conversely the presence of any one normal response to stimulation indicates a normal labyrinth and eighth nerve.

2. A spontaneous nystagmus in the vertical plane either upward or downward indicates a central lesion.

3. If stimulation produces a "perverted" or an "inverse" nystagmus, then again the lesion is central.

As to the subject of localization of a central lesion, the author lays stress on the importance of visualizing the various pathways constituting the vestibular apparatus, and as an aid presents ten diagrams, which should be carefully studied and mastered.

The author then goes on to state certain hypothetical findings, showing on the charts where the lesions should be in order to produce the various findings presented.

Fisher and Lyman have made a study of the ear in stunt flying by reproducing the effects of stunt flying by whirling the aviator in a laboratory device.

The vertigo effects of ear stimulation learned in the air are noted:

1. There are three cardinal planes of vertigo: horizontal, frontal and sagittal.

2. A sense of being turned in a horizontal plane—horizontal vertigo—is less disturbing than a sense of being whirled in a vertical plane—vertical vertigo. Each semicircular canal, if stimulated, produces a vertigo in its own plane.

3. When a disturbing or disabling vertigo is indicated in the vertical canals, the effects can be greatly ameliorated by bringing the vertical canals in a horizontal plane, by bringing the head forward.

4. All types of vertigo are made less and less disturbing by continual repetition.

The practical application of the vertigo study to stunt flying is then discussed, showing what positions of the head after certain stunts render the vertigo less disturbing.

Graef discusses the subject of vertigo and offers the following summary:

1. The most frequent cause of vertigo is some fault in the internal ear, especially progressive degenerative disease.

2. In a case of dizziness, if labyrinthine tests are normal in vertigo and nystagmus, there is no fault here, and the vertigo is due to something irritating the static apparatus.

3. If vertigo alone or nystagmus alone is produced by the tests, the fault is outside the labyrinth itself.

4. If tests show no reaction in vertigo or nystagmus, the fault lies in the labyrinth or in the eighth nerve.

5. Hemorrhage into the labyrinth is a rare condition. Emboli lodging in the labyrinthine blood stream are a cause of Menière's syndrome, as seen in caisson workers.

6. The eye is next in importance to the internal ear as a source of vertigo and should receive full attention after the labyrinthine condition has been tested.

7. Aside from paralysis a common fault in the ocular muscles is weakness of a superior rectus, with imbalance—hyperphoria. Vertigo on looking upward is therefore frequently met with. Even when lacking a frank fault—hyperphoria—the elevators of the eyeballs are the least able to do their work and suffer most through exhaustion by the efforts required of them.

Graef discusses (1) the physiologic basis of the phenomena from the vestibular tests, and (2) evidences of damage to one or both static labyrinths, together with points in the differential diagnosis between labyrinthine and intracranial disease; (3) evidences of intracranial disease found by labyrinth tests.

Hastings has studied the reactions of the normal labyrinth and has made the following observations in testing over 800 applicants for the U. S. Aviation Service:

1. As to spontaneous nystagmus, it was not once found.

2. As to after-nystagmus from turning, the average duration in 282 applicants was 23.49 seconds after right rotation and 24.17 seconds after left rotation (15 to 35 being the extremes in about 99 per cent of the applicants examined).

The average difference in seconds in after-nystagmus from right rotation and left rotation was 2⅛ seconds, in 200 cases studied. In only two of the 200 cases was there a difference of 10 seconds, and in no case more than 10 seconds between the right and left rotation after-nystagmus.

3. Spontaneous past-pointing was not found.

4. The past-pointing reaction after turning was elicited according to rule in about 90 per cent of those examined. The average number of times of past-pointing in 283 cases was as follows: Right arm, 2.22; left arm, 1.91 (after right turning). Right arm, 2.18; left arm, 1.96 (after left turning). Of 700 applicants, 47 cross-pointed with one or both arms on turning

for past-pointing, as follows: On right turning, 5 crossed with right arm, 26 with left arm. On left turning, 18 crossed with right arm, 21 with left arm. The right arm crossed 23 times to 47 with the left arm. This fact the author explains by stating that there is in right-handed men a better control over the right arm than the left arm, and during the loss of equilibrium, that is extreme in a certain proportion of those turned, there was a greater loss of control over the left than the right arm. The fact that only 5 of the 47 cross-pointed with the right arm on right turning is to be explained in this way: That for the right arm to cross-point on right turning, there is interference because of the large muscular development of the chest in right handed men. The following conclusions are offered: (a) In turning for past-pointing allowance must be made in some individuals for the extreme loss of equilibrium that results, in which case the cross-pointing is not an evidence of disease but possibly a hypersensitive condition of the end organ of the labyrinth. (b) In all cross-pointing, the left arm is more likely to cross-point than the right.

5. The falling reaction was found to be abnormal only 11 times in 257 times on right turning, and 10 times in 259 times on left turning.

In conclusion, the author reports a few cases where abnormal reactions occurred both from turning and from douching in men apparently normal in every respect. The author does not attempt to explain them.

Heitger discusses the Bárány tests. After a short historical introduction, the author gives the technic as worked out by Jones and his associates.

Speaking of the interpretation of the tests, the author mentions the following data as suggestive of a peripheral lesion:

1. A proportionate impairment of the function of the cochlea and kinetic-static labyrinth.
2. History or presence of tinnitus.
3. Proportionate impairment of the responses from the vertical canals and from the horizontal canals.
4. A proportionate impairment of nystagmus and vertigo.

On the other hand, the following suggest a central lesion:

1. Normal cochlea with impaired or nonresponsive canals.

2. Normal responses from the horizontal canal, but impaired responses from the vertical canals, or vice versa.

3. Normal nystagmus but impaired vertigo from the horizontal canal or vice versa.

4. Normal nystagmus but impaired vertigo from the vertical canals, or vice versa.

5. Normal nystagmus and vertigo from any semicircular canal but (a) impaired past-pointing in any direction of any extremity, or (b) impaired or absent normal falling.

6. Spontaneous vertical nystagmus.

7. If the semicircular canals of one side are nonresponsive and there exists a nystagmus to that side.

8. The production of conjugate deviation of the eyes instead of nystagmus.

Before pointing out the various ways in which a routine examination of the labyrinth can be of service, Jones corrects two misconceptions held by various otologists; misconceptions which have interfered with a universal adoption of these tests by the otologic profession.

As to the first misconception, namely, that a study of the internal ear and its intracranial pathways is a neurologic work, the author rightly insists that although the information may be of neurologic value, it is elicited by ear tests and hence is an otologic study, to the same degree that an eye examination, although of value to the neurologist, is distinctly an ocular study.

As to the second misconception, namely, that such examinations are generally regarded as being extremely difficult, the author states that the entire physiology of these ear tests may be summed up in four sentences as follows:

1. The eyes are always drawn in the direction of the endolymph movement.

2. The vertigo is always in a direction opposite to the endolymph movement.

(a) Past-pointing is always in a direction opposite to the vertigo.

(b) Falling is always in a direction opposite to the vertigo.

Stated differently, all the objective phenomena, the eye-pull (the slow component), the past-pointing and the falling, occur in the direction of the endolymph movement.

As to the value to the otologist of these tests, the author mentions:

1. In the routine study of ear cases.
2. In determining the cause of vertigo.
2. In intracranial localization.

Jones writes on the value of the ear examination to the neurologist, emphasizing the aid given in making a differential diagnosis between peripheral and central lesions, and in the localization of central lesions. The author warns the enthusiast that the ear examination is not for the purpose of making a neurologic diagnosis; it merely gives additional data by a series of refined experiments, to the other methods at the command of the neurologist. Obviously, in order to obtain reliable data from an ear examination, it is essential that the technic of examination should be accurate and painstaking.

Jones states in elementary terms the physiologic basis for the results brought out by the vestibular tests and concludes with a statement of the standard for entrance in the Aviation Section of the Signal Corps of the U. S. Army.

Lemere has studied the oculomotor reaction to labyrinth stimulation from the point of view of the actual anatomic position of the canals and their physiologic relations to the movement of the head on the body, with the position of the body vertical and immobile. He concludes that there is a direct relationship between stimulation of the following canals and the action of the following muscles: the superior canals and the superior and inferior recti; the horizontal canals and the internal and external recti, and the inferior canals and the obliques. Also the horizontal canals are stimulated by the movements of the head nearly in a horizontal plane, the superior in a longitudinal plane, and the inferior in a transverse plane.

The erroneous conception of the positions of these canals should be corrected and they should be called horizontal, longitudinal and transverse, respectively.

Lewis has observed that the influence of altitude on the hearing and the motion sensing apparatus of the ear is negative.

Parsons and Segar examined 100 naval aviators to determine if there was any correlation between the equilibrium

tests as established by the Bárány chair and actual flying ability and have come to the conclusion that no such correlation exists.

Robertson describes some new methods of testing an aviator's ability to withstand sudden variations of atmospheric temperature and pressure at different altitudes.

The apparatus employed is a steel cabinet to which a vacuum pump is attached. The cabinet is supplied with a mercurial altigraph, the scale of which is marked to represent the vacuum in feet of altitude for each one-half inch. This altigraph will register from the earth's surface to an altitude of 25,000 feet. A window permits observation of the applicant during the test. The cabinet is air tight and provided with four pitcocks, one for connection with the altigraph, one for a negative pressure gauge, one to allow air to enter the cabinet, and the other connecting the vacuum pump. In subjecting a man to this test of rarefaction of air, he is subjected to the regular physical tests for blood pressure, pulse, muscular tone and rotation, both before and after the test in the cabinet. In the cabinet the air is exhausted at the rate of 1,000 feet altitude per minute until he has reached a height of 6,000 feet. He is kept in this rarefaction for a certain length of time, then a fall is simulated by allowing air to enter the cabinet, and the time it takes to bring the pressure to that of the earth's surface represents a rapid or slow descent. The object is to compare results of tests before and after subjecting patient to this rarefaction, to see what influence the latter has upon the former, and if any deductions can be made concerning which men would make the best aviators. The following are offered:

1. A man whose labyrinth is stimulated by a trial flight would be more acute than one in whom the labyrinth became less active.

2. A man whose muscle tone is more, or at least as great, after a trial would be better than a man whose muscle tone is impaired.

3. A man whose blood pressure is elevated would be better than if the blood pressure were lowered.

Scruton discusses results in examining applicants for the Aviation Service. The author presents a record card showing the various reasons for rejection. Of 1,364 flyers examined,

514, or 38 per cent, were rejected. Only 21 out of the 1,364 flyers were rejected for failing to respond correctly to the rotation tests. The author lays stress upon the careful attention to the minutest detail relative to technic, stating that the cause of cross-pointing and divergent pointing is absolutely an improper position of the head during rotation. The flyer must have a perfect aural mechanism, perfect vision, no fundus changes, excellent heart and lungs, sound teeth and no form of hernia.

Stimson states that the static labyrinth is not the only organ of equilibrium, as it is in intimate connection with other special senses, such as sight, touch, muscle and joint sense in the maintenance of balance. But the end organ of the static sense differs from the others in that its only function is that of the maintenance of balance, whereas with the others that is merely a collateral function. Therefore, whenever perfect equilibration is interfered with and the sensation of vertigo is produced, the attention should chiefly be directed to the static labyrinth.

The various conditions causing vertigo are:

1. Primary disease of the labyrinth, labyrinthitis of the various types, hemorrhage or effusions; embolus of the labyrinthine artery, e. g., air embolus in caisson workers; irritation of the labyrinth occurring during a middle ear inflammation, such as acute otitis media; sudden destruction of the labyrinth, rarely by trauma, but usually by hemorrhage or serous effusion, in diabetes, Bright's disease, or where the vascular system is affected; neuritis of the eighth nerve resulting from some chronic focus of infection, such as chronic disease of the faucial tonsils, pyorrhea alveolaris, etc.; most frequently of all a primary chronic degenerative process within the labyrinth, independent of syphilis or infectious fevers.

2. Toxemias affecting the vestibular apparatus, such as ptomain poisoning, constipation, alcohol, quinin, tobacco, lead poisoning, nephritis, gout, rheumatism, syphilis and infectious fevers such as scarlatina, typhoid, mumps, etc.

3. Definite lesions within the brain itself along the pathways from the ear, such as tumor, hemorrhage, thrombus, infarct, abscess, gumma, tubercle, specific neuritis, multiple sclerosis, syringomyelia, polioencephalitis or meningitis.

The information to be derived from the ear tests consists of

the presence or absence of normal reactions, or their deviations from the normal. If after stimulation, there occur no reactions whatsoever, no nystagmus, no vertigo, no past-pointing, no falling, etc., the lesion is either in the labyrinth or the eighth nerve. If stimulation of the labyrinth evokes perfectly normal responses, nystagmus and vertigo, there is evidently no impairment of the vestibular apparatus, and if it is for a cause of dizziness that we are searching, we must look elsewhere for something that is producing an irritation of the balance mechanism. If any of the responses goes through normally, the labyrinth and eighth nerve as the seat of the lesion are eliminated. If stimulation of the ear fails to produce any nystagmus, there must be a lesion along the pathway from the ear to the eyes, in the vestibulocular tract. If no vertigo results, there is a lesion along the pathway from the ear to the cerebral cortex, the vestibulocerebellocerebral tract.

If, after stimulation, the patient shows nystagmus and no vertigo, or vertigo and no nystagmus, the lesion is not labyrinthine. The presence of normal nystagmus with absence of vertigo would indicate a normal tract from the ear to the eyes, but an involvement of the other pathway, the one from the ear to the cerebrum, after the two have divided into their individual tracts, i. e., between Deiters' nucleus and the cerebral cortex. The presence of a normal vertigo and the absence of nystagmus would indicate a lesion along the fibers going to the eye muscle nuclei at some point beyond the division of the two pathways into their individual tracts, i. e., between Deiters' nucleus and the posterior longitudinal bundle.

In conclusion, the author summarizes as follows: The static labyrinth is the essential organ balance.

The labyrinth, together with its various nerve pathways, constitutes the vestibular apparatus or balance mechanism.

A disturbance of any portion of the vestibular apparatus gives rise to vertigo.

It is only a disturbance of the ear or its associated pathways, and nothing else, that can induce vertigo. When disease in remote organs causes dizziness it is only because of a definite influence on the ear mechanism.

In these tests we now have an accurate and scientific method of determining the integrity of the internal ears, the eighth

nerve, and the pathways through the medulla oblongata, the pons, the six cerebellar peduncles, the cerebellum itself and the cerebral crura to the cerebral cortex.

In cases of vertigo of doubtful etiology, examine the vestibular apparatus.

Swan and Lake examined 110 individuals with regard to the time of commencement and duration of nystagmus in the caloric test. They used seven ounces of water at 60° F. The time for the water to flow out of the irrigator was 60 seconds. In forty-one instances the average time of onset was 50 seconds; the total duration of nystagmus, 37 seconds. They observed that there seemed to be no constant duration of the nystagmus and no constant time of onset, and that in health these times varied in different individuals. In thirteen instances no nystagmus was obtained under the given conditions, from which they deduce that 60° F. is not cold enough and 55° F. would be better. In neurasthenic conditions, nystagmus is prolonged; in one case 75 seconds' duration was noted. After two months' rest this period was reduced to 25 seconds.

III.—Diseases of the External Ear.

Henderson, G. E. W.—Deafness Due to the Placing of Candle Grease in the External Auditory Meatus. J. Laryngol. Lond., 1918, XXXIII, 51.

Henderson reports a case of deafness due to the placing of candle grease in the external auditory meatus. The patient had placed a cone of grease into the meatus to keep out the noises of the city at night. The grease had melted and molded itself to the drum, which gave the appearance of a drum in chronic cararrhal otitis media. Heat by means of the hot water bag loosened the mold of grease from the drum.

This can illustrate what harm may be done through the agency of the lay press in offering its readers hints on matters pertaining to health.

IV.—Nonsuppurative Diseases of the Middle Ear; Otosclerosis.

1. Brady, A. J.—Ossiculectomy in Chronic Adhesive Otitis. J. Laryngol., Lond., 1918, XXXIII, 50.

2. Emerson, F. P.—Changing Methods and Advances in the Treatment of Progressive Deafness Following Chronic Hyperplastic Otitis

Media (Second Communication). Ann. Otol., Rhino. & Laryngol., St. Louis, 1918, XXVII, 1250.

3. Frederick, M. W.—Otosclerosis. N. York M. J., 1918, CVII, 152.

4. Gluck, Chas.—Common Deafness: Its More Accurate Handling. Med. Rec., N. Y., 1918, XCIII, 410.

5. Maybaum, J. L.—Factors in the Causation of Tinnitus Aurium. N. York M. J., 1918, CVII, 780.

6. McKenzie, Dan.—Medication of the Middle Ear per Tubam. J. Laryngol., Lon., 1918, XXXIII, 118.

7. Pollock, H. L.—The Treatment of Otosclerosis from an Etiologic Standpoint. Illinois M. J., Chicago, 1918, XXXIV, 268.

8. Sautter, C. M.—Pilocarpine in Chronic Deafness. N. York M. J., 1918, CVIII, 592.

9. Sonnenschein, Robert.—Proper Diagnosis as a Guide to Prognosis and Operative Treatment of Impaired Hearing. Illinois M. J., Chicago, 1918, XXXIV, 324.

Brady discusses the influence of ossiculectomy in chronic adhesive otitis, from his experience in three cases. Tinnitus was the distressing condition for which the operation was performed. One case was a failure, one a success as regards both the tinnitus and the hearing, but as this case was not followed up, nothing can be said about permanent improvement. The other case operated twenty years ago shows relief of tinnitus and improved hearing at the present time, thus proving that the universal pessimism expressed by his colleagues concerning the permanent benefit from this procedure is not justified.

Emerson in this second communication concerning the etiology and treatment of progressive deafness following chronic hyperplastic otitis media, presents several case reports illustrative of the modern conception of this frequent malady.

This conception is that the etiology consists in a chronic infection subject to acute exacerbations with varying degrees of virulency, constantly tending to invade continuous as well as remote structures by continuity or through the lymphatics or blood stream. The foci of infection should be removed if possible, but there are secondary foci beyond our reach in many chronic cases. These cases must be treated on broad lines of corrected metabolism, hydrotherapy, out of door living, rest, etc., as well as locally, remembering that audition is only one function gone wrong in the symptom complex.

Gluck states that the majority of cases of deafness are due to three, and in a small percentage of cases to four, abnormalities found in the nose and throat, and that if these abnor-

malities are properly corrected the deafness will be invariably improved and often cured. These abnormalities are:

1. The two faucial tonsils.
2. Adenoids and adhesive bands in the nasopharynx.
3. Infected sinuses.

Gluck warns against the removal of turbinates until sufficient time has elapsed to determine whether the correction of the above abnormalities would cause a return of the turbinates to their normal size. If after two or three weeks the turbinate tissue remains redundant this can be reduced surgically. Of course, this does not apply to cases of polypi and intractable sinus disease where removal of turbinate tissue is indicated.

Maybaum goes into considerable detail in discussing the various manifold causes of tinnitus.

In the first place, he divided all cases into two classes:

1. Tinnitus without defective hearing, due to functional disturbance of the auditory nerve center, functional disturbance of the labyrinth, or abnormal condition of the circulatory system.

2. Tinnitus with deafness, due to a pathologic condition in the external, middle or internal ear.

In the former class are those conditions due to arteriosclerosis, anemia, epilepsy, migraine, toxemias from overindulgence in alcohol, tobacco and drugs, such as quinin and the salicylates. Finally neurasthenia is a factor.

So many helpful suggestions are scattered throughout the article that it is impossible to present them all in a short abstract. For these a careful perusal of the original article is necessary, and it will prove time well spent.

The following are a few selected at random:

1. It is important in giving a prognosis, to select the facts as to the constancy or intermittency of the noise. The latter type offers a better prognosis, as the causative factor is less likely to be of a permanent nature.

2. Continuous noises may disappear only after the patient becomes completely deaf.

3. Relief following catheterization of the eustachian tube is a favorable sign.

4. In general, the chances for recovery from tinnitus are less hopeful than the hope of relief from deafness.

5. It is important to remember that persistent and prolonged treatment is fraught with greater harm to these patients (with middle ear disease) than entire neglect of treatment. A far better plan is to give two or three courses of treatment of a few weeks' duration with sufficient intervals between them.

McKenzie has been treating chronic catarrh of the middle ear by means of an oily solution of iodin sprayed into the middle ear by way of the eustachian tube. The formula is:

℞ Iodin resublimat	gr. ii to iv
Ol. Sassafras	m. i
Menthol	gr. iii to v
Camphor	gr. iii to v
Ol. Eucalyp	m. iii
Paraff. liq	ad ℥1

The stronger solution of iodin is used whenever possible, the feelings of the patient being the guide. Inflation and injections are made not less often than once weekly. The author has had success with this method. The liquid is sterile of itself. While the fluid should be warmed, it should not be too hot.

Sautter reports a case of chronic catarrhal deafness that was improved by the administration of pilocarpin solution by mouth for one week. Patient was instructed to take the medicine to the point of physiologic reaction or until a free perspiration was induced. Upon returning the following week, the patient stated that she had had a most profuse perspiration, with an immediate change of hearing, which was quite perceptible to herself as well as to her family. In testing the ear, Sautter noted an improvement in the lower tone limit from 55 d. v. to 16 d. v., or normal low limit. The hearing for voice had improved from 3 inches to 8 feet, and for the watch from zero to 1 inch.

Sonnenschein makes a plea for a careful differential diagnosis between chronic middle ear catarrh, otosclerosis and otitis interna, before deciding on prognosis and operative procedure. His conclusions are:

1. To make an accurate diagnosis of the aural condition present, a thorough tuning fork examination usually is necessary.

2. Of the middle ear affections, the chronic catarrhal process is amenable to intranasal treatment, but in the socalled otosclerosis, treatment, especially operative, is not only useless, but often injurious both as regards the ear and the nose.

3. Involvement of the inner ear, as seen in the degeneration of the organ of Corti or the auditory nerve, is a contraindication to nasal operations or air inflations, except in that the latter may at times somewhat relieve the tinnitus.

4. In all nasal operations, particularly those upon the turbinate bodies, great care should be used to conserve the mucosa as much as possible, in order to avoid metaplasia of epithelium with consequent atrophic rhinitis.

Otosclerosis.—Frederick reviews the subject of otosclerosis pointing to the disappointing chapters which have been written into medicine when this malady was under discussion. The author's purpose in this communication was to point to some lines of investigation and to arouse enthusiasm in the breasts of some of the younger members of the profession in the hope that eventually some light might be shed upon this disturbing condition, rendered particularly so because the sufferers were usually those in the prime of life.

Pollock discusses otosclerosis from the standpoint of its being due to a disharmony of the ductless glands, which in turn is caused by an infective focus. The treatment then is directed to the removal of any foci of infection, followed by an attempt to restore the harmony of the ductless glands by the hypodermic injection of adrenalin in gradually ascending doses, beginning with three minims and reaching ten to twelve minims at the end of eight weeks. Injections are given three times weekly. After an interval of four to six weeks the treatment is again started, followed by another rest, and so on. Improvement has been noted in some cases.

V.—Suppurative Diseases of the Middle Ear and Mastoid; Facial Nerve.

1. Beck, J. C.—Surgical Pathology of the Mastoid. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 869.

2. Bigelow, F. Nolton.—Types of Mastoid Structure with Special Reference to Their Differentiation by Means of Stereoradiography. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 887.

3. Black, W. D.—Indications for Radical Mastoid Operation in Chronic Suppurative Otitis. J. Missouri M. Ass., St. Louis, 1918, XV, 121.

4. Bodkin, H.—The Maxillary Antrum in Mastoiditis. J. Laryngol., Lond., 1918, XXXIII, 200.

5. Bowers, W. C.—Answer to Opponents of the Radical Mastoid Operation. Laryngoscope, St. Louis, 1918, XXVIII, 790.

6. Dench, E. B.—Conditions Developing in Chronic Suppurative Otitis Media Which Should Constitute the Basis for Exemption from Military Service. Laryngoscope, St. Louis, 1918, XXVIII, 717.

7. Freer, Otto T.—The Attic of the Middle Ear; Its Suppurative Conditions. Illinois M. J., Chicago, 1918, XXXIII, 189.

8. Gluck, Chas.—Common Deafness; Its More Accurate Handling. Med. Rec., N. Y., 1918, XCIII, 410.

9. Gluck, Charles.—Nasal and Aural Polypi; Their Permanent Cure. Laryngoscope, St. Louis, 1918, XXVIII, 186.

10. Graham, H. B.—Osteosclerosis of the Temporal Bone in Chronic Suppuration. Laryngoscope, St. Louis, 1918, XXVIII, 872.

11. Howley, B. M.—Facial Paralysis in Ear Disease. J. Med. Soc., N. Jersey, Newark, 1918, XV, 270.

12. Huntington, W. H.—Mastoiditis. Med. Rec., N. Y., 1918, XCIII, 849.

13. Kahn, Alfred.—Paraffin in the Ear and Nose. N. York M. J., 1918, CVII, 681.

14. Kahn, Alfred.—Outlines of a New Instrument to Be Used in Skin Grafting in the Radical Mastoid Cavity. Laryngoscope, St. Louis, 1918, XXVIII, 875.

15. Kerrison, P. D.—A Case of Abducens Paralysis Complicating Mastoiditis. Brief Discussion of This Complication as an Indication for Surgical Treatment. Med. Rec., N. Y., 1918, XCIV, 941.

16. Kerrison, P. D.—Report of a Case of Chronic Middle Ear Suppuration Treated by the Carel-Dakin Method, Following a Radical Operation Laryngoscope, St. Louis, 1918, XXVIII, 537.

17. Kyle, J. J.—The Modern Mastoid Operation. Laryngoscope, St. Louis, 1918, XXVIII, 805.

18. Lathrope, G. H.—Acute Mastoiditis as a Complication of Infectious Diseases. Jour. Am. M. Ass., Chicago, 1918, LXXI, 451.

19. Lyon-Mercado, M.—A Note on the After-Treatment of the Radical Mastoid Operation. Lancet, Lond., 1918, CXCIV, 373.

20. Maclay, Neil.—Malaria Occurring Immediately After Operation for Acute Mastoiditis. J. Laryngol., Lond., 1918, XXXIII, 269.

21. McNaught, Harvard.—The Role of the Pseudodiphtheria Bacillus in the Pathogenesis of Ear, Nose and Throat Diseases. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 245.

22. Orton, Henry B.—Local Anesthesia in Mastoid Operations. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 1261.

23. Prentiss, H. J.—To Determine the Location of the Lateral Sinus from External Markins. Also, the Approach to the Mastoid Antrum, as Modified by Surface Markings. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 116.

24. Price, C. E.—Middle Ear Infections. Illinois M. J., Chicago, 1918, XXXIV, 204.
25. Richards, J. D.—Report of a Case of Granuloma of the Mastoid Simulating Subperiosteal Abscess. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 587.
26. Scarlett, Rufus B.—Earache and Its Management. N. York M. J., 1918, CVII, 631.
27. Schiller, A. Noah.—Facial Paralysis Following Infection of the External Auditory Canal. N. York M. J., 1918, CVII, 403.
82. Sharpe, Wm.—Operative Treatment in Selected Cases of Chronic Peripheral Facial Paralysis. Jour. Am. M. Ass., Chicago, 1918, LXX, 1354.
29. Smith, J. Morrisette.—The Radical Mastoid Operation: Indications, Technic and Results. Laryngoscope, St. Louis, 1918, XXVIII, 584.
30. Sobotky, Irving.—Severance of the Chorda Tympani Nerve. Boston M. & S. J., 1918, CLXXVIII, 224.
31. Steel, Geo. E.—Mastoiditis. N. York M. J., 1918, CVII, 63.
32. Wheeler, J. M.—Paralysis of the Sixth Cranial Nerve Associated with Otitis Media. Jour. Am. M. Ass., Chicago, 1918, LXXI, 1918.

Beck discusses the surgical pathology of mastoid disease. In acute mastoiditis two types are described: (1) The cell route, or confluent mastoiditis, and (2) the vascular route or osteophlebitic mastoiditis. In the confluent type, the bone bleeds easily, the lining membrane is edematous, the intercellular septa are broken down, pus is present. In the osteophlebitic type, the bone bleeds very little, there is little if any pus, the cells are well preserved and the membrane not very edematous. It is this latter type that produces the greater number of infections in the sinus, due to the extension from the venous infection in the bone.

In discussing chronic mastoid disease the author mentions ten varieties:

1. Osteofibrosis or sclerosis, in which the bone is converted into more or less solid bone.
2. Osteofibrosis with fistular tracts, in which in addition to the above sclerotic process, a few cells are met with and a number of necrotic tracts lined with granulation tissue.
3. Osteofibrosis, fistular tracts and cholesteatomatous infiltration.
4. Osteofibrosis, fistular tracts, cholesteatomatous infiltration with cavity formation of cholesteatomatous masses.
5. Tuberculous osteitis in which fistular tracts are present.
6. Syphilitic osteitis, usually a sclerosed bone.

7. Actinomycotic osteitis, in which the cortex is practically riddled with fistulæ.

8. Reparative osteitis found in reoperated cases.

9. Foreign body in mastoid. (a) Sequestrum; (b) Any other substances.

10. Neoplasm. (a) Sarcoma; (b) carcinoma; (c) endothelioma.

The author promises a later presentation of the histologic changes by means of microphotographs.

Bigelow refers to the different types of mastoid structures and the importance of the different types in determining the result or course of an infection, and then goes on to show that these different types can be recognized by means of stereoradiography.

After referring to the usual classification of mastoids into three types, the pneumatic, the diploetic and the mixed, the author adds that in order to make this classification useful for clinical study and comparison, it must be made more descriptive and sufficiently comprehensive to include such other variable factors of mastoid structure as have clinical significance, among which are the thickness and density of the cortex and cell partitions, the number, distribution and arrangement of cells, and the location of the sinus. Both the diploetic and the pneumatic mastoid can be divided into three distinct anatomic types, each having both clinical and surgical significance peculiar to itself.

The three types of diploetic mastoids are:

Type 1. Persistence of the infantile type in which the mastoid mass is diploetic. In this type the thin outer compact layer of the antral wall has increased in thickness from the periosteal side and is of extreme density; the inner layer of "fetal cells" is still seen; the mastoid mass is entirely diploetic, and the separating layer between the diploe and the cavity of the antrum is much increased in thickness.

Type 2. Persistence of the infantile type, in which the mastoid mass is dense. With exception of the mastoid mass, which is dense, the structures are as described under Type 1.

Type 3. The mixed infantile and pneumatic mastoid, with the infantile characteristics predominating.

The radiogram, especially when a stereoscopic study is

made, will practically always show the sinus to be far forward in the infantile types. When to this appearance is added a suggestion of cell structure towards the tip of the mastoid and a cellular area just above and behind the middle ear, the remainder of the mastoid appearing dense, in the writer's experience type 1 is to be confidently expected. When the entire mastoid appears dense, with the exception of a small cellular area, often but a faint suggestion, just above and behind the middle ear, type 2 is to be expected. When to one or the other of the above findings there is added a small group of large cells, though they be but faintly outlined, type 3 is to be looked for.

The three types of pneumatic mastoids are:

Type 1. The pure pneumatic type, practically all of the cell structures containing air.

Type 2. The mixed pneumatic and infantile mastoid, with the pneumatic characteristics predominating.

Type 3. The "double decked" mastoid. The cells are arranged in two tiers, separated one from the other by a bony septum which in location and general appearance often closely resembles the internal table.

Dr. Isaac Gerber writes for the author a few paragraphs on how a thorough X-ray examination of the mastoid is made and how the quality of the plate is determined.

Bigelow adds, in conclusion, that a proper X-ray examination will in most instances reveal the type of mastoid, and that this information, irrespective of what pathology may be revealed, should enable the observer to predict the clinical course and the prognosis of a middle ear infection with greater exactness and place therapeutic measures on a more scientific and less empiric basis. For example, if the X-ray examination shows the mastoid to be one of the infantile types, the observer is thereby informed that in the case under consideration mastoid symptoms may not appear or may be very indefinite, and that the middle ear infection is quite likely to become chronic. Forewarned by this knowledge, he should prevent such a contingency by early drainage of the antrum, regardless of the absence of the classical indications for the performance of this operation. If, on the other hand, the radiogram shows the mastoid to be one of the pneumatic types, the observer

should not hasten the patient to the operating table at the onset of stormy and threatening mastoid symptoms, but should remember Schwartze's dictum that, barring unusual symptoms, acute mastoids do not require operation unless the stormy mastoid symptoms continue unabated longer than eight days after incision of the drum membrane; in other words, he should wait a sufficient length of time for the reestablishment of atmospheric pressure within the mastoid cells.

The author has reported thirteen cases to illustrate the clinical and surgical significance of different types of mastoid structure, with special reference to their determination by means of the mastoid radiogram.

Twenty prints of radiograms of the mastoid and five illustrations of sectional bones accompany the article.

Numerous observations made by the author on the special operative difficulties of certain types of mastoids as well as their clinical significance have not been mentioned, because, as it is, the abstractor's enthusiasm for this subject has led him to devote to it more space than he had originally intended. A study of this paper in the original is heartily recommended.

Black divides the indications for the radical mastoid operation into two classes: The indications for immediate operation and the indications for a deferred operation.

The immediate operation is done to save life in such cases as present severe and dangerous complications, such as otitic brain abscess, epidural abscess, cerebellar abscess, thrombosis of the lateral sinus, extensive cholesteatomata, beginning symptoms of meningitis of otitic origin, sudden facial paralysis or labyrinthitis or labyrinthine irritation.

The deferred operation is indicated for the relief of symptoms, such as a discharge which resists the more conservative procedures, for two or three months; gradual reduction in the hearing when hearing in the other ear is good; pain in ear, over mastoid or over side of head; headache, particularly if it is less when the discharge increases; fever and malaise; vertigo; where life insurance was desired.

Bodkin reports on the condition of the maxillary antrum in fifty consecutive cases of mastoid disease coming to operation. His investigation tends to show that in cases of otorrhea the maxillary antrum is seldom sterile, but, particularly in

chronic cases, is almost invariably infected, even though this has not proceeded to the length of obvious empyema of the sinus. As to whether this subacute or latent infection is of importance; whether it is primary and a cause of the mastoiditis or whether it is secondary to the otitis media, are questions difficult to decide. However, the author believes the mastoid healing is promoted by cleansing and antiseptic care of the maxillary antrum.

Bowers upholds the radical mastoid operation. After answering in great detail the various objections against the radical mastoid operating, and viting his technic, he tabulates his results in 112 cases and offers the following conclusions:

1. That many men are performing radical mastoid operations without having acquired reasonable proficiency.
2. That many radical mastoid operations are performed when not indicated.
3. That by many operators too little consideration is given to preservation of hearing.
4. That many cavities are not properly cared for, either by the surgeon or by the patient.
5. That it is possible to get dry cavities and improved hearing, and that these results are attainable in most cases.
6. That the operation is not dangerous and that complications are seldom unavoidable.
7. That the condition calling for operation is usually a very dangerous one and that it is too frequently dealt with lightly.

Dench discusses chronic suppurative otitis media from the military point of view, stating what types should and what types should not constitute a basis for exemption. In the first place, the subject is discussed from the point of view of the amount of the discharge, and, in the second place, from the information that can be obtained upon physical examination. From the point of view of the amount of the discharge, four types are considered: (1) Those where there is a constant profuse discharge; (2) a constant light discharge; (3) an intermittent discharge; (4) no discharge apparent to the patient. Where there is a constant profuse discharge, the patient should be exempted, if for no other reason than that the discharge is disagreeable to others and demands time and facilities in keeping it clean. Concerning the other types, no

decision can be reached from a consideration of the discharge itself. Other symptoms, such as vertigo, headache and deafness, are deciding factors. These cases of intermittent discharge occurring with each attack of "cold in the head" the author would accept for limited service.

The author's classification from the physical findings are as follows:

1. Cases of small central perforation. These are usually easily relieved by local treatment.

2. Cases of large kidney shaped perforation without caries of the ossicles and with the mucosa either dry or moist. Not serious.

3. Cases of large kidney shaped perforation with the presence of granulation tissue. These cases should be accepted for observation and treatment, and results noted.

4. Cases with a perforation in the upper posterior portion of the membrana tympani with a sinus leading into the attic. These are dangerous and should not be accepted unless operated on radically.

5. Cases with complete absence of the drum, with sinuses leading in front and behind the short process of the malleus into the attic. Accepted if ear is dry and hearing up to standard. Otherwise should be operated radically.

6. Cases with small perforation through Shrapnell's membrane. Should be operated radically first.

The author closes his discussion with a plea for more reconstruction work in the form of the radical operation by competent men, not at Base Hospitals, but at the different institutions throughout the country, where this work is being done in civil practice. Many otologists past the age for active service could thus be rendering valuable service to the Government.

Freer discusses the suppurative conditions of the attic of the middle ear, first describing its topographic anatomy, showing that it is subdivided into a number of compartments with easily blocked intercommunications and communications with the mesotympanum.

The acute and chronic suppurative conditions are described. In the acute attic suppuration the earache is more severe than that of a simple mesotympanic abscess, and it is liable to persist after paracentesis. Also little or no discharge is liable to

appear the first day or two, and mastoid complications are more apt to develop than in the simpler form of mesotympanic abscess.

Two types of the chronic attic suppuration are described: In one there is a large perforation of the pars tensa, with or without the presence of cholesteatoma; in the other, the pars tensa with the manubrium mallei is usually intact, but above the processus brevis is seen a characteristic fistulous perforation remaining from the acute stage. There may or may not be polypi formation.

In the first group, thorough cleansing and drying treatment will often give excellent results, while in the second group the course of procedure is not so simple, because of the fact that the fistulous tract is not always very apparent. With special instruments the attic is washed and curetted and the tract enlarged if necessary.

Gluck claims to cure all discharging ears by correction of abnormalities in the nose and throat, just as mentioned in the previous section. In acute cases the nasopharynx is cleared out at the same time the drum is incised, and the tonsils removed as soon as the pain and fever have subsided. Surgical attention to the septum or other nasal fossæ structures is given subsequently.

Good results are claimed, whether the discharge is acute or chronic, the only difference being the time element. Gluck has found it unnecessary to advise the radical mastoid operation in a single case since treating his patients along these lines.

Gluck refers to the permanent cure of aural polypi by removing diseased tonsils and adenoids after removing the polypi.

Graham believes, contrary to the view held by Cheatle of London, that osteosclerosis of the mastoid can be a result of chronic suppuration instead of the cause.

Anteroposterior stereoscopic plates can demonstrate the condition.

After a few historical and anatomic remarks concerning the subject of mastoiditis, Huntington discusses (1) the etiology, stating that adenoid hypertrophy is one of the greatest etiologic factors in middle ear troubles and subsequent mastoid invasion; (2) symptomatology; (3) diagnosis and aids to

same; (4) indications and contraindications to the operation.

The following indications are mentioned:

1. Cases of acute mastoiditis, with persistent pain on pressure over the tip or antrum. Persistence of fever after a successful paracentesis has been done, or in which a sagging of the posterosuperior meatal wall is found.

2. Cases of acute suppuration of the middle ear, with dizziness, vomiting, nausea, or beginning facial paralysis, or with signs of intracranial or labyrinthian involvement.

3. Cases of long standing middle ear suppuration which resist all local measures, and because of good hearing and other reasons do not indicate a radical mastoid.

4. Cases of subperiosteal abscess.

Kahn speaks of the value of spraying paraffin over the skin graft in the radical mastoid cavity, stating that it seals the skin firmly in place and holds it there, and that it has the advantage over gauze in the fact that the latter might tear the graft loose when it was removed.

Kahn has devised two instruments to facilitate the introduction of skin grafts into the radical mastoid cavity. The first instrument is a thin plate of glass or metal, one and one-half by three inches. This plate has an opening through its center and notches on one side of the plate, making a keyhole shaped opening. One end of the plate can be extended into a handle for easy manipulation. The other instrument consists of a rod gradually apically shaped at one end. At the other end a handle is attached, placed at an angle for easy manipulation and with the idea of not obstructing the view. The rod is grooved from apex to base by four gutters an equal distance apart. The rod is six inches long. Three inches from the apex the rod is notched to fit slot in first instrument. The apex of the rod is roughened by extremely minute projections, and the projection at the top of the apex is the highest.

Technic.—Holding the plate in the left hand, the graft is placed on the plate over the notch, the center of the graft corresponding to the round hole in the plate; and the rod with the apex up is held in the right hand. The plate is then passed down over the rod, the rod going through the round hole in the plate. The graft, now hugging the rod, is carried into

the cavity, and by means of passing a long needle or "teaser" along the grooves in the rod the graft is spread out over the cavity. By suddenly pulling the rod away, the graft remains.

Kerrison reports a case of paralysis of the sixth nerve complicating mastoiditis, with complete restoration of function three days after a thorough mastoid operation. From a study of the literature, which reveals the facts that in mastoiditis associated with abducens paralysis, the mortality is much greater and the percentage of sixth nerve recoveries is much less in cases not operated upon than in those in which the mastoid operation is performed. Kerrison concludes that the occurrence with suppurative mastoiditis of paralysis of the sixth nerve of the same side, should be regarded as a positive indication for the mastoid operation.

Kerrison reports a case of chronic middle ear suppuration treated by the Carel-Dakin method. After the radical operation the wound cavity was flushed with Dakin's solution. A short gauze wick, saturated with the same fluid, was placed loosely in the cavity and a gauze dressing applied. On the following morning this dressing was removed and the following routine instituted: The nurse was instructed to fill the wound cavity every hour during the day with Dakin's solution, the patient lying for twenty minutes thereafter with the sound ear buried in the pillow, after which the fluid was allowed to run out and the ear protected with sterile absorbent cotton. At night—i. e., at the time of the last Dakin bath—the wound cavity was dried, then filled with chlorazine paste and a protective gauze dressing applied. The treatment was carried out for three successive days. Then once daily the wound cavity was thoroughly irrigated with Dakin's solution. The cavity, having been dried, was then filled with chlorazine paste and further protected by a pad of sterile cotton placed in the concha and held in position by collodion. This procedure was practiced daily during the first three weeks and thereafter on alternate days.

Epitomizing the effect, the author states that in actual duration of the postoperative treatment, this method did not in this case result in curtailment, as he was discharged as cured exactly two months after his operation. Chlorazine paste seems greatly to promote epidermization in certain parts and

in others to retard it. The following advantages may be directly attributable to this method:

1. The bone cavity from start to finish seemed surgically clean.

2. There were no masses of granulations to contend with.

3. Epidermization over essential points, e. g., the posterior recess and the eustachian orifice, was particularly rapid.

4. Treatment is practically without discomfort to the patient.

Kyle condemns the packing of the mastoid wound with gauze, and instead advocates simple drainage and irrigation by means of rubber tubing. With this method he claims:

1. The middle ear becomes dry, as a rule, in twenty-four hours after the simple operation.

2. The posterior bone cavity is sterile in a few days after operation, at which time the tube may be withdrawn.

3. Healing is more rapid than by any other form of dressing.

4. In exposure of the lateral sinus and dura, this method is the most logical and satisfactory way of draining.

5. An abscess in a mastoid process, ethmoid sinuses or antrum of Highmore, should as far as possible be drained, constantly aerated and flushed with warm salt solution, preferably twice a day. The result of long suppuration and slow healing is usually due to packing with gauze and lack of aeration.

Lathrope discusses the subject of acute mastoiditis as a complication of infectious diseases and presents facts and analogies from which he draws the following conclusions:

1. The army camp in question appears to have suffered this past winter an "epidemic" of acute mastoiditis.

2. This exhibition of mastoid infections is only one expression of the general streptococcus incidence in the camp.

3. The latter streptococcus invasion, in turn, is but a sideshow in the very widespread wave of streptococcus disease throughout Southern army camps.

4. It is peculiar in two points: (a) The dominant organism is the streptococcus viridans, and not a hemolyzing streptococcus, as appeared elsewhere; and (b) its chief expression

is in the form of an unusually severe involvement of middle ear and mastoid tissues.

5. Measles played a prominent part in giving the streptococcus a start in its work, and stands by itself as an etiologic factor in the development of the severer types of mastoiditis.

Lyon-Mercado discusses the after-treatment of the radical mastoid operation and gives the results of a series of twenty-five cases performed within the last year:

The subjective symptoms and objective indications of the twenty-five cases are tabulated as follows:

1. Presence of fetid discharges varying from over one year to six years' duration..... 10 cases
2. Presence of purulent discharges of two years' standing with symptoms of headache, vomiting, vertigo and optic neuritis ..... 2 cases
3. (a) Fistulous opening into the mastoid with cholesteatoma, 1 case; (b) with cholesteatoma alone, 4 cases.... 5 cases
4. Tuberculous disease of mastoid, (a) with facial paralysis of five months' duration before operation; (b) with no facial paralysis ..... 2 cases
5. Presence of existing middle ear disease with lateral sinus phlebitis and thrombus in lateral sinus..... 2 cases
6. Fetid discharge of two years' standing with, (a) single polypi; (b) multiple polypi..... 4 cases

After-treatment: The posterior operative wound, except in the lateral sinus cases, was closed at the time of operation and healed by first intention.

Unless there was edema, intense pain, or a rise in temperature, there was no need to dress the cases till the fifth morning. The mastoid antrum was then syringed through the external concha-meatal opening (made expressly for drainage) with 3 oz. of H_2O_2 (dilution 1/2); or fresh eusol, half strength. The mastoid antrum was then cleaned out with two strips of ribbon gauze soaked in a solution of picric acid (½ per cent) in methylated spirit (7½ per cent). The ribbon gauze varied from six to ten inches in length. A third strip of ribbon gauze soaked in the same solution was lightly packed into, and left in, the mastoid antrum till the next dressing.

After the first dressing alternate day dressings only are required. The amount of the packing left in the mastoid antrum is lessened as it begins to heal over. About the fourth week the packing is discontinued, the ear being merely syringed.

Maclay reports a case of malaria occurring immediately after operation for acute mastoiditis, as an instance calling for keen judgment, because the advent of a rigor in association with any suppurative disease in the middle ear cleft suggests the onset of an intracranial complication which calls for immediate attention, but in the present case, the extent to which the mastoid was implicated by the pyogenic disease, the presence of healthy bone covering the sigmoid groove and bulb—the severity of the rigors, the apparently complete recovery on the following days and the absence of other signs of intracranial mischief—caused one to consider the possibility of some other explanation of the acute constitutional disurbance. This was found when the patient admitted having been bitten by mosquitoes in France, and the finding of malarial parasites in the blood.

McNaught reports two cases of mastoiditis due to the pseudodiphtheria bacillus, concerning which organism the following summary is presented:

1. The pseudodiphtheria organisms occur normally on many surfaces and in many tissues of the body. It is probable that under normal conditions, even the socalled virulent types are nonpathogenic but may become so by symbiosis or a depressed general or local state.

2. The organism, so far as is known, is not a mutation form of the Klebs-Loeffler bacillus, though at times resembling it in its morphology. Its behavior in culture towards sugars and the fact that it has its own opsonic index are additional proofs of its distinctiveness.

3. Negative results from guinea pig inoculations are not conclusive proof that it is a pseudodiphtheria bacillus, as virulent Klebs-Loeffler bacilli may give the same results.

4. In true infections with this organism agglutinin is formed and the serum opsonin is decreased. A mild bactericidal power of serum arises in patients, and a very pronounced bacteriolysin can be produced in experimental animals.

Orton describes his method of procedure in the use of local anesthesia in mastoid operation. One-half hour before the time set for the operation ¼ grain morphin and 1/150 grain atropin were given hypodermatically, and the ¼ grain morphin repeated at the time of the anesthesia. The skin was anesthetized along the line of incision from above the auricle to one inch below the tip of the mastoid, at about which point a deep injection was made to block off the auricularis magna nerve. Another nerve requiring blocking off is the occipitalis minor, which is about 1½ inches posterior to the external canal and on a level with the floor of the canal. Then the needle was pushed in deeply through muscle and under periosteum, also along posterior wall of the canal. The operation is begun after an interval of five to ten minutes. When the antrum is reached, it is filled with the solution, which is allowed to remain until the tip cells are cleared away. Novocain in the strength of ½ to 1 per cent was used. From an experience on nine mastoids, the author notes the following results:

1. Perfect anesthesia without prolongation of the operation.
2. Absence of danger to pneumouia from inhalation.
3. Convalescent period shorter.
4. Postoperative pain much lessened.
5. It is to be recommended in all cases following pneumonia and empyema where ether is contraindicated.

Prentiss draws attention to the relation between the position of the lateral sinus and the curve of the supramastoid crest (third root of the zygoma). A very obliquely placed crest indicates that the sinus is well posterior to the field of approach to the antrum, and a horizontally placed crest indicates that the sinus is close to the field of operation.

The approach to the antrum is influenced by the supramastoid crest, because the crest indicates the petrous portion of the cerebral fossa. For instance, if the crest runs backward well above the external auditory canal, the cone of approach to the antrum may be made with little likelihood of exposing the meninges. On the other hand, if the crest runs backward just tangent to the canal, the approach must be made well below the crest.

The text of the article is much clarified by the illustrations.

Price reports several cases of middle ear infections, illus-

trative of the principle that the course and outcome can never definitely be prognosticated from signs and symptoms presented, hence he makes a plea for early paracentesis and a roentgenogram.

Richards reports an unusual case of apparent subperiosteal abscess in a child one year of age. Upon operating, however, there appeared not pus but a grayish yellow tumor occupying the site of the mastoid and completely filling it. The tumor had as its base the dura of the temporosphenoidal and cerebellar lobes. The vertical limb of the sigmoid sinus was obliterated. There was no posterior bony canal wall to the meatus and the anterior wall was largely eroded. Sarcoma was suspected, so the mass was curetted away. Microscopic examination revealed a granuloma and the patient made an uneventful recovery.

Scarlett contributes a paper for the general practitioner on earache, discussing its importance and emphasizing the fact that an earache from middle ear infection should not go unrelieved for over twelve hours, but that an incision of the drum should be performed. He warns against the instillation into the canal of oily preparations, as they tend only to macerate the epithelium and obscure the picture.

Smith discusses in a most intelligent way the subject of the radical mastoid operation. Three reasons are offered for the attitude of some men in condemning the procedure:

1. The operation has been recommended and attempted in many cases where it was not indicated.
2. It has been attempted by men who have not taken the trouble to thoroughly familiarize themselves with the technic.
3. Proper attention has not been given to the after-treatment.

To determine which type of cases demand the radical operation, the author divided the chronic infections into three classes:

1. Those cases of intratympanic infections with little or no involvement of the attic. These rarely if ever require a radical operation.
2. Those cases involving not only the tympanum but the attic, antrum, and—to a limited extent—the mastoid.

These cases demand the nicest judgment in deciding for or against the radical operation.

3. Those cases involving the intratympanic attic, antrum and mastoid structures as well.

These are the cases in which the radical operation is most frequently indicated.

After discussing the technic of the radical operation and reporting ten cases, the author draws the following conclusions:

1. The radical mastoid operation is not indicated in all cases of chronic aural infections.

2. It is indicated in a certain percentage of chronic infections, and no other surgical procedure will answer its purpose.

3. With the proper technic it is a comparatively safe operation.

4. The hearing in the average case—not in all—requiring a radical operation should be improved.

5. The hearing—allowing for the reduction due to removal of the drum, malleus and incus—depends on the amount of fibrous tissue allowed to remain or form over the internal wall.

6. The after treatment is most important, and its neglect will result in failure to obtain the desired results.

7. The hearing will be better where the tube remains open, the objection being that there may be a recurrence of the discharge at any time, due to a fresh tubal infection.

Sobotky reports a case of injury to the chorda tympani nerve during a paracentesis for acute otitis media. Patient complained of inability to taste and of a numb feeling over the right side of his tongue. A probe examination showed insensibility to touch, and tests with solution showed no taste in anterior half to two-thirds of the tongue on the side of the injury, except possibly at the very tip. Taste was present on the right posterior one-third.

Steel approaches the subject of mastoiditis from the standpoint of the general practitioner, and discusses the following points:

1. Necessity for operative interference.
2. Danger to life.
3. Danger to hearing.
4. Amount of deformity.

5. Time for healing to occur.
6. Time required to be away from business.

In deciding concerning the necessity for operative interference, the following terminations should be kept in mind:

(a) The case may go on to spontaneous recovery with little or no treatment and function will be restored to normal, especially in children.

(b) It may recover as far as mastoid symptoms are concerned, but the ear will continue to discharge steadily or intermittently, the perforation in the drum membrane remain open, and function be progressively impaired.

(c) The patient may ultimately recover spontaneously after an unduly prolonged period of aural discharge, the perforation in the membrana tympani healing; but deposits, bands or adhesions may remain which impair function, give rise to a distressing tinnitus, and finally result in marked deafness.

(d) Complications may develop, with or without operation, which may result fatally or jeopardize life.

(e) The patient may undergo mastoidectomy and recover with or without impairment of hearing.

Laboratory aids, such as blood count, bacteriologic examinaton and X-rays are mentioned as of service in reaching a decision.

The prognosis in a mastoidectomy done where there are no cranial complications and in a patient otherwise healthy is exceedingly good.

In a mastoidectomy done at the right time before destructive changes occur in the middle ear, the hearing will return to what it was before the operation.

As to length of time for the healing of the mastoid wound, the average is six weeks.

In an uncomplicated mastoiditis, the patient should remain in the house for ten days after operation and from business for at least two weeks.

Whalen discusses paralysis of the sixth cranial nerve associated with otitis media, the condition otherwise known as Gradenigo's syndrome. The condition is characterized by (a) acute otitis media (with or without external suppuration, and with or without mastoid reaction); (b) isolated paralysis or paresis of the abducens nerve of the side corresponding to the

diseased ear, and (c) intense and extraordinarily persistent pain localized, not as ordinarily in the mastoid region, but in the frontal, temporal and parietal regions of the same side.

The anatomic explanation of the syndrome is thoroughly discussed.

Facial Nerve.—Howley presents a report of three cases of facial paralysis in acute ear disease. The diagnosis of the first case was acute otitis media with Bell's paralysis. In the second case, a facial paralysis occurred the day after a simple mastoidectomy for acute mastoiditis, and the diagnosis was a facial paralysis from pressure due to postoperative hemorrhage. The third case was one of facial paralysis due to pressure of the exudate from acute otitis media and mastoiditis before operation.

Schiller reports an unusual case in which there was middle ear infection and facial paralysis following a diffuse external otitis of months' duration. The patient was a diabetic, and after a radical mastoid operation under local anesthesia the infection and paralysis cleared up.

Sharpe describes a new technic for the operative treatment of chronic peripheral facial paralysis, the distinctive feature of which is the utilization of only one-half of the hypoglossal nerve for anastomosis to the entire peripheral cut end of the facial nerve, thus leaving a portion of the hypoglossal nerve in continuity to regain its own complete function, which it does within a period of two months. The latter is made possible by cutting several of the intact nerve fibers of the remaining half of the hypoglossal nerve and approximating them by a single suture to the peripheral cut portion of the hypoglossal nerve.

The technic is described as follows:

"By means of a small curved incision just posterior to the angle of the lower jaw, and anterior to the mastoid process (the ear lobe being held forward), the facial nerve is exposed as it crosses the styloid process externally; the nerve itself is now severed as close to the stylomastoid foramen as possible so that a peripheral portion of at leat one-half inch is obtained for anastomosis. The facial nerve should always be exposed first, as it has been reported absent or rather 'not

found' in several patients. Possibly the best landmark to use in finding the hypoglossal nerve is to expose the external carotid artery; just below its occipital branch the hypoglossal nerve curves forward and to the outer side of the main trunk of the external carotid artery to lie between the posterior belly of the digastric muscle externally and the hypoglossus muscle internally. By blunt dissection, the hypoglossal nerve can be easily exposed forward so that a portion of at least 1 inch, and still better, 1½ inches, is obtained for the anastomosis with the facial nerve. The entire hypoglossal nerve, within its sheath, and being held by its sheath, is now incised longitudinally in its midline by a small thin bladed scalpel, and its nerve fibers are now separated in the midline longitudinally for a distance of one inch at least; at the distal part of the bisection the outer half is now severed and its central cut end is brought backward and upward to be sutured, sheath as much as possible, to the entire peripheral cut end of the facial nerve. Small black silk sutures (waxed) on French needles are very satisfactory. No foreign material is placed about the anastomosis. After the facial anastomosis has been completed the small scalpel is again used to separate longitudinally and to cut several nerve fibers of the remaining half of the hypoglossal nerve in the same plane of the former incision. The central cut end of these fibers is now approximated to the peripheral cut portion of the outer half of the hypoglossal nerve by a single suture through their sheaths."

A modification is suggested for patients having only partial peripheral facial paralysis, in whom the reaction of degeneration is not present, and yet the paralysis is of such a character, owing to the deformity, contractures, conjunctivitis and other complications, that an attempt might be made to improve the condition. The central cut portion of one-half of the hypoglossal is inserted into the facial nerve through a small right angled slit of its sheath and adjacent fibers.

In conclusion, the author warns that no patient should be operated on, no matter how complete the paralysis, unless it is definitely ascertained that the facial nerve is permanently injured, or a period of intensive treatment of at least one year following the injury has elapsed without a definite improvement of the condition.

VI.—Intracranial Complications.

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3. Braislin, Wm. C.—Brain Abscess Caused by Chronic Suppurative Otitis. N. York M. J., 1918, CVII, 446.

4. Braun, Alfred.—The Pathology of Sinus Thrombosis. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 461.

5. Braun, Alfred.—The Diagnosis of Sinus Thrombosis. N. York M. J., 1918, CVIII, 1069.

6. Dabney, V.—Two Cases of Unusual Wounding of the Lateral Sinus. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 607.

7. Dench, E. B.—Acute Meningitis. Laryngoscope, St. Louis, 1918, XXVIII, 501

8. Dickie, J. K. Milne.—Two Interesting Cases of Middle Ear Suppuration with Complications. J. Laryngol., Lond., 1918, XXXIII, 106.

9. Faulkner, E. Ross.—Two Cases of Sinus Thrombosis Which Presented Unusual Difficulties in Diagnosis. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 970.

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11. Hastings, H.—Intracranial Complications of Diseases of the Ear, Nose and Throat. Calif. State J. M., San Fran., 1918, XVI, 520.

12. Kahn, Alfred.—A Case of Labyrinthal Meningitis with Suggestions for a New Labyrinth Operation. Med. Rec., N. Y., 1918, XCIV, 930.

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14. Page, John R.—Report of a Case of Mastoidectomy for Acute Suppurative Otitis Media, Followed Later by Facial Paralysis, Almost Total Deafness, Meningitis, Death. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 589.

15. Perkins, Chas. E.—Leucocytosis of the Spinal Fluid in the Diagnosis of Meningitis. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 974.

16. Perkins, Chas. E.—A Case of Meningitis Treated by Labyrinthectomy and Decompression. Laryngoscope, St. Louis, 1918, XXVIII, 695.

Sinus Thrombosis.—Ballou reports three cases of lateral sinus thrombosis. The thrombus was on the right side in all cases. Ages 15, 23, 20. Chronic history of aural suppuration 10, 17, and 6 years. Immediate causes: Cold, influenza or operation. Organisms: B. pyocyaneous, staphylococcus and streptococcus pyogenes, and streptococcus hemolyticus. The

symptoms were characteristic, showing the usual triad: chills, intermittent fever and sweats. Two of the patients while in the hospital had rigors lasting one-half hour. The highest temperatures were 103, 103, 105. There was a marked flush of the right cheek only—i. e., the side of the lesion.

The aural findings: Case 1.—Drum destroyed, tympanic cavity dry but filled with epithelial debris. No mastoid swelling. Case 2.—Small round perforation in middle of posterior half of drum, scanty discharge, later absolutely dry; no swelling of mastoid. Case 3.—Drum destroyed, tympanic cavity filled with granulation tissue; moderate discharge and pulsation visible. Edema over the mastoid.

The blood cultures and eye grounds were negative in all cases, also the lumbar puncture.

Leucocyte counts: 30,000, 12,000, 16,000.

X-ray showed small sclerosed mastoid, sinus far forward but no thrombus.

The findings at operation were in the main identical in all cases. The mastoid was sclerosed but vascular. Pulsating pus under tension was present. The lateral sinus was superficial, very far forward, gangrenous or covered with lymph and granulations. Pulsations were visible or palpable, even with presence of thrombus. Tympanic cavity filled with granulation tissue and cholesteatoma.

The treatment was a radical mastoid operation Removal of all diseased bone in contact with the sinus until apparently healthy sinus was reached in both directions.

As to ligating the jugular vein, the author believes that where the thrombus can be removed and free bleeding obtained at both ends, the jugular vein need not be ligated. This was the treatment in two cases, and in the third the ligation of the jugular had no effect, as there was no thrombus in the jugular vein and free bleeding was obtained in the bulbar end after ligation.

Braun offers a very instructive discussion on the subject of the pathology of sinus thrombosis. So many interesting and important topics are presented in every paragraph that no abstract can do justice to the article. Nothing more then will be attempted than to refer briefly to a few of the salient points brought out by the author. The causative factors in the pro-

duction of a thrombus are: (a) slowing of the blood stream; (b) increased agglutinability of the blood plateleta; (c) an increased coagulability of the blood plasma, and (d) changes in the vessel wall.

As to the manner in which thrombosis of the lateral sinus occurs as a complication of middle ear and mastoid disease, the following ways are mentioned:

1. The inner table of the mastoid over the sinus may be diseased and an abscess form between the sinus and the inner table. This results in an inflammation of the outer sinus wall which in turn leads to the formation of a thrombus within the sinus.

2. The inner table over the sinus may be diseased and cause an extension of the inflammatory process to the sinus wall without the intermediation of a perisinus abscess. The phlebitis results in a thrombus formation.

3. A thrombus may form in one of the smaller veins of the mastoid process and extend into the lateral sinus.

After discussing the various changes occurring in a thrombus as well as concomitant changes brought about in adjacent and more remote structures, the author mentions the possible end results of a thrombus in the sinus:

1. The patient dies of general sepsis before the clot breaks down.

2. The clot breaks down in the center, and the pus finally breaks through the outer wall of the sinus, so that the abscess within the sinus communicates with the perisinus abscess.

3. The pus within the sinus breaks through the visceral wall of the sinus and produces a cerebellar abscess or a meningitis.

4. The thrombus organizes and results in obliteration of the sinus.

5. Part or all of the thrombus becomes absorbed, resulting in recanalization of the sinus.

Braun, in discussing the subject of the diagnosis of sinus thrombosis divides the symptoms into those which are due to the general systemic poisoning and those which are due to the local inflammatory lesion in the affected sinus. The former symptoms are common to all cases of sinus thrombosis; the latter symptoms differ according to the sinus or sinuses involved. The symptoms due to the local lesion in the sinus

are further subdivided into those which are caused by the inflammation in the sinus wall, and those which are the result of obstruction to the venous circulation, caused by the thrombus.

A. Symptoms referable to the local lesion in the lateral sinus:

I. Symptoms due to the inflammation of the sinus wall—

1. Pain may or may not be present. Nothing characteristic.

2. Optic Nerve Changes.—Those occur in only a moderate number of cases. The character of the lesion is a neuritis or hyperemia. Atrophy is rare. Marked visual disturbance is uncommon.

3. Paralysis of the sixth nerve sometimes occurs.

4. Peryngulitis producing a tender cordlike mass at the side of the neck.

5. In volvement of the glossopharyngeal nerve, causing paralysis of the soft palate.

6. Involvement of the vagus nerve, giving rise to hoarseness and slowing of the pulse rate.

7. Involvement of the spinal accessory nerve, causing spasmodic contractions, or paralysis of the sternomastoid and trapezius muscles.

II. Symptoms due to interference with the venous circulation:

1. Griesinger's sign—a painful swelling at the point of exit of the mastoid emissary vein. Not a diagnostic sign.

2. A painful swelling in the posterior triangle of the neck, due to a spreading of the thrombotic process into the posterior condyloid vein. Not a diagnostic sign.

3. Gerhardt's sign or an unequal fullness of the external jugular veins on the two sides. Not diagnostic or reliable.

Examination of an exposed sinus may or may not give information of diagnostic importance. Usually, when a perisinus abscess is present, there is no thrombosis, but there are exceptions. Discolorations in the wall are suggestive. The presence or absence of pulsation in the sinus is of no diagnostic value. If the wall has a doughy feel or a resistant feel, or if the wall is collapsed, it speaks for a thrombus.

B. There are no local symptoms which are characteristic of thrombosis of the superior or inferior petrosal sinuses.

C. In infectious thrombosis of superior longitudinal sinus,

the local symptoms are edema of the soft tissues in the frontal, parietal and temporal regions.

D. Symptoms referable to the local lesion in the cavernous sinus:

I. Symptoms due to inflammation of the wall—

1. Pain, either a generalized headache or facial neuralgia. Pain may be absent.

2. Optic nerve changes comparatively infrequent. When present, the change is either a neuritis or choked disc.

3. Paralysis of the third, fourth, first division of the fifth and sixth nerves. Paralysis of the third is present in almost every case.

II. Obstructive symptoms are:

1. Exophthalmos, constant and early. Soon bilateral; not painful on pressure.

2. Chemosis, constant.

3. Edema of lids, constant.

4. Edematous swelling in pharynx, occasionally.

The distinguishing feature between cavernous sinus thrombosis on the one hand and orbital abscess or cellulitis, ethmoiditis or acute conjunctivitis on the other hand, is that only in the former are there paralyses of the ocular muscles; that the symptoms become bilateral in a few days; that pressure on eyeball is painless; that there is absence of characteristic symptoms of the other diseases.

Passing from a consideration of the local symptoms, whether inflammatory or obstructive in nature, Braun next discusses the general symptoms, which are the same irrespective of the location of the thrombus.

General symptoms of sinus thrombosis:

1. Temperature, usually high and remittent. May be regular or normal.

2. Chills, accompanying each rise in temperature. Chills may be absent.

3. Sweats usually follow the chills. May occur in the absence of chills.

4. Rapid pulse.

5. Gastrointestinal symptoms simulating typhoid.

6. Vertigo, not common.

7. Disturbances of the sensorium are rare.

8. Metastases, more common in the lung, but may occur in any part of the body.

From the above enumeration of symptoms, local and general, it is seen how uncertain the diagnosis may be at times. Typical cases are easy; others almost impossible.

Blood culture is mentioned as one of the most valuable diagnostic aids, but a negative culture does not exclude sinus thrombosis. Meningitis may give a positive culture, but this can be differentiated by means of the cerebrospinal fluid examination. If other than the streptococcus is found, some other condition should be suspected. Among the more frequent conditions causing bacteremia and which should be excluded before a diagnosis of sinus thrombosis is made, the following are mentioned: Endocarditis, pneumonia, typhoid, tonsillar and accessory sinus infections, scarlet fever, erysipelas and meningitis.

Aspiration of the sinus for diagnostic purposes is not without danger and not always trustworthy. Incision may be necessary, and even then there may occur free bleeding from either end in the presence of a thrombosis.

Finally, sinus thrombosis may be mistaken for malaria, typhoid, pneumouia, erysipelas, septic endocarditis, meningitis, grippe, tonsillitis and cervical adenitis, and the author discusses briefly the distinguishing features of these diseases.

Dabney reports two cases in which the lateral sinus was wounded in an unusual location during the performance of the radical mastoid operation. In the first case the sinus was wounded in curetting what was supposed to be the roof of the antrum. In the second case the sinus was wounded during the elevation of the insertion of the sternomastoid muscle from the mastoid tip.

Dickie reports two cases of sinus thrombosis which are clear from an aurist's point of view, but which received a variety of diagnoses prior to the aural examination. Which illustrates the importance of examining the ears in all cases with rigors and severe illness of obscure origin.

After the first case had been operated twice, the first operation consisting of the mastoid and sinus operation, and the secondary consisting of free exposure of dura over temporal

region and Newman's operation on the labyrinth, the patient had a rise of temperature with acute pain in the left side and arm, which was probably an infarct of lung. Patient recovered. The second case had septic infection long before seen by the aurist. This patient died.

Faulkner describes two cases of sinus thrombosis which presented unusual difficulties in diagnosis. The first case was that of a boy with acute suppurative otitis media. The discharge had practically stopped, and the patient would have been considered well except for pyemic temperature. A simple mastoid operation performed and dura and sinus exposed, but both appeared healthy. Instead of progressing favorably, patient continued to have a pyemic temperature, pulse rate usually under 100, the mastoid to all appearances undergoing resolution, apparently an embolic process in the right shoulder, with streptococcus irridans in the blood. The focus was not thought to be in the ear, because no case of streptococcus irridans in the blood had been reported with a primary focus in the ear. However, as a last resort, the sinus was explored and a perisinus abscess around the bulb was discovered. The culture from the pus in this region showed streptococcus hemolyticus. The patient recovered.

In the second case the patient had a discharging ear three weeks previously, but none at the time of examination. The patient complained of pain over the frontal region and said he had had a chill every day for the past week. In spite of daily elevations of temperature to 104 with chills, there were no local ear symptoms. There was no chill or fever on the fourth day, but on the fifth day there were two sharp upward elevations of temperature. Operations revealed liquid pus in the sinus, but no perisinus abscess or granulations on the surface.

Brain Abscess.—Braislin reports three cases of brain abscess following chronic suppurative otitis media, in all of which there were few cerebral symptoms. In none of the cases was there noticeable slowing of the puse. There was a history of purulent discharge from the ear and recurrent attacks of pain in the ear or in the corresponding side of the head.

Two cases were abscesses of the left temporosphenoidal

lobe, in one of which was noticed a typical amnesic sensory aphasia. Two recovered.

Glogau reports a case of otogenic temporal abscess on the left side, with aphasia, and hemiplegia and facial paralysis on the right side, cured by drainage. The interesting features of the case were the following: At the time of the radical mastoid operation the abscess was in the latent stage, hence no brain exploration was attempted in the absence of any suspicious dural changes. Over two weeks later, manifest symptoms developed, at which time the brain was explored, even in the absence of dural changes. The abscess was located at the upper temporal convolution quite away from the middle ear focus.

The infection was an indirect one, either by means of the lymphatics, the sheaths of the arteries or nerves, or by extension of thrombophlebitis of the pial vessels.

The author explains the crossed convulsions, hemiplegia, hemianesthesia, facial paralysis as due to the remote action of the increased intracranial pressure upon, and of the inflammatory reaction around the cortical centers within the anterior, posterior, central and inferior frontal gyri.

MENINGITIS.—Dench presents the subject of otitic meningitis, and while including under the term otitic meningitis in its broadest sense such conditions as extradural abscess and serous meningitis, the chief purpose of the author in the present communication is to give his views on the treatment of otitic leptomeningitis. These cases he divided into (a) fulminating, (b) frank, and (c) latent types. The fulminating present the well recognized symptoms of meningitis, as easily diagnosed, and terminate fatally in from twelve to forty-eight hours. While this type may be due to an otitic infection, the author believes that many of these cases can be better called coincident meningitis, as autopsy has frequently failed to reveal the connection with theotitic infection. The frank cases likewise present the well recognized symptoms of meningitis and offer no difficulties in diagnosis. But the latent cases are the ones offering the greatest difficulty in diagnosis and the ones which can be given most help by surgical intervention.

In these cases the first symptoms which present themselves are those of general malaise, moderate temperature, ranging

from 99 to 101, some headache and vomiting, particularly when these occur after an operation on the middle ear and mastoid.

As regards treatment, the author advises:

1. Removal of the primary focus of infection.

2. Exposure of a large area of dura, with subdural drainage in cases of fulminating type.

3. Repeated lumbar punctures in all cases.

In conclusion, the author holds out a hope for every case when surgical intervention is permitted, unless they are actually *in extremis* when seen by the surgeon.

Kahn reports a case of labyrinthal meningitis, with recovery, which he attributes to the fact that the diseased area involved the inner wall of the middle ear, that this wall was soft and necrotic, and that it was further accidentally injured at the time of the radical operation in an anxious endeavor to remove all necrosed bone; that it was through this passage by way of the internal auditory meatus that the labyrinth was destroyed and that meningitis took place. This wall afterwards broke down, and the author feels that the patient recovered because there was direct drainage from the meninges through the internal auditory meatus, through the internal ear, middle ear, etc., through an accidentally artificially created opening.

Taking his cue from this fact, Kahn saw the possibilities of a new labyrinth operation in cases of meningitis secondary to labyrinthitis. His technic is as follows:

1. Performance of the radical mastoid operation.

2. Extension of the radical operation to its furthest limits. The facial ridge must be cut down to its very last shaving. The sinus should be exposed from above the knee down toward the bulb as deeply as possible. The bone in front of the sinus must be cut away as deeply as possible, exposing the soft parts beyond; the dura outlining the middle cranial fossa above the middle ear should be exposed as deeply and as far forward as possible—in fact, the dura should be exposed over such an area that it will form a junction with the dura covering the sinus region, and the exposure should extend as far forward as the superior semicircular canal. The dura outlin-

ing the middle and posterior fossæ and covering the sinus should be exposed.

3. The promontory is now opened, and a direct passage is made through it, so that the internal auditory meatus communicates through a direct passage with the middle ear. The modiolus and whole internal ear should be broken down, and this communicating path between the internal auditory meatus and the middle ear should be made as large as possible. When the modiolus is broken down and the internal auditory meatus opened there will be an escape of cerebrospinal fluid; the passage must then be packed tightly.

4. The bridge of bone now remaining between Trautman's triangle posteriorly and the middle ear, which holds the facial nerve and the semicircular canals, should be broken down and absolutely destroyed. The brain will thus be exposed over an area extending from the carotid artery in front to beyond the sinus behind, and the area of dura in the region of the internal auditory meatus has a straight passage for draining to the outside.

Layman reports a cure of a case of purulent leptomeningitis of otitic origin, in which the Crockett technic was employed. This method, to which the author ascribes his first cure of diffuse purulent meningitis, consisted in making a one and one-half inch opening of the dura at the bottom of the bone opening and inserting subtemporal drains along the top of the petrous portion of the temporal bone.

Page reports the case of a boy, ten years of age, on whom a simple mastoid operation was performed, and three days later there began to develop a facial paralysis which was complete in two days. Two days later there occurred suddenly, with vomiting and tinnitus, but apparently without nystagmus or vertigo, total loss of hearing in the opposite ear, and it was then noticed positively for the first time that there was almost total loss of hearing on the operated side. A high leucocyte count and cloudy cerebrospinal fluid were present.

The interesting point in this case is the cause of the deafness. The sudden loss of hearing with roaring tinnitus and vomiting would first of all point to the labyrinth, but because of the fact that from first to last the patient was at all times able to sit up without disturbance of equilibrium, speaks

against this view. The conclusion reached was that meningitis was the cause of the persistent vomiting and deafness, and that the invasion of the meninges very likely took place along the route of the facial nerve.

Perkins discusses the value of leucocytes of the spinal fluid in the diagnosis of meningitis and wisely places this where it belongs, namely, as an aid to clinical observation. When thus considered, he regards the cell count of the spinal fluid, with the determination of the polymorphonuclear percentage, as one of the most important laboratory aids in the diagnosis and management of meningitis. He warns that one should always be on the lookout for other diseases, which give leucocytosis of the spinal fluid, especially syphilis in its various forms, because the most that can be interpreted from the presence of an increased leucocyte count with a substantial polymorphonuclear percentage, is that an inflammation exists either within the meninges themselves or in their immediate proximity. The deciding factors are the clinical phenomena.

Perkins reports a case of meningitis following a suppurative labyrinthitis, which passed into the latent stage and was associated with facial paralysis. For three days there was a clinical picture of meningitis, but spinal fluid examination revealed but 15 cells to the m. m. Twelve of these, or 80 per cent, were polymorphonuclear. Operation was deferred because of the small number of cells, but in commenting on the case the author thinks he should have operated because of the clinical symptoms and the high polymorphonuclear percentage. Twenty hours later the laboratory reported 512 cells to the m. m., and operation was performed, at which time a labyrinthectomy with cerebellar and subtemporal decompression was done.

Two days after the operation the brain was sloughing and foul smelling. Dakin's solution was used with marvelous effect, the brain became firm and healthy, and dermatized over. The patient died in a comatose condition about three and one-half months later, the exact cause of death being obscure. The spinal fluid remained clear throughout, consequently the author feels that death did not result from a reinfection of the meninges. Operation and autopsy were refused.

MISCELLANEOUS.—Boot describes the following cases:

1. Acute mastoiditis with operation and recovery, followed in three months by severe headache and dizziness with vomiting. Operation disclosed an extradural abscess, after which patient recovered.

2. Chronic suppurative otitis media on left side, with temporosphenoidal abscess in a boy fourteen years old, in whom the important symptom was the loss of power to name objects. Operation was successful.

3. Chronic suppurative otitis media on left side with subperiosteal abscess in front of the auricle, extradural abscess and temporosphenoidal abscess. Operation succeeded in evacuating the pus, but patient died suddenly after nine days. The loss of power of naming objects was demonstrated in the case. Streptococcus hemolyticus was recovered from the abscess cavity at postmortem examination.

4. Chronic suppurative otitis media on the left side, cholesteatoma, mastoiditis, labyrinthitis, dehiscence of tegmen tympani, abscess of temporosphenoidal lobe, meningeal hemorrhage and jaundice. In this case the temporosphenoidal lobe was explored with a large needle, but no pus found. At autopsy the abscess cavity was found to have been punctured by the exploring needle, from which fact the author concludes that it is a mistake to use a needle for exploring the brain. This patient also had a loss of memory for words.

5. Acute suppurative otitis media, mastoiditis, sinus thrombosis, abscess of temporosphenoidal lobe, meningitis, operation and death five days later.

6. Chronic suppurative otitis media on the left side, aural polyp, cholesteatoma, facial paralysis, fistula of external semicircular canal, meningitis. Operation performed and patient doing well two weeks later when report was made. In this case the function of the left vestibular system was interfered with, as shown by nystagmus to the right, but not abolished, as shown by the fact that the nystagmus to the right was reversed when the left ear was irrigated with hot water.

7. Chronic suppurative otitis media, with cerebellar abscess, meningitis and death. The marked symptoms were the severe headache, the unsteadiness of gait and the pain the back.

The abscess, discovered at the autopsy, lay over the saccus endolymphaticus.

8. Syphilitic meningitis, total labyrinthine deafness in one ear and nearly total labyrinthine deafness in the other ear. After intensive antiluetic treatment, patient had total recovery of hearing. The severe headache was most troublesome.

9. Fracture of skull with bilateral labyrinthine deafness.

10. Chronic suppurative otitis media with cholesteatoma, mastoiditis, sinus thrombosis, slough of sinus wall, embolic pneumonia, hernia cerebelli, facial paralysis, operation and recovery.

11. Bilateral mastoiditis, with thrombosis of the superior longitudinal sinus and jaundice. The thrombosis of the sinus was discovered at autopsy. The important symptoms noted were: (a) General interference with mental processes, explainable by the disturbed nutrition of the cortex; (b) nose bleed, probably due to venous stasis in the upper part of the nose, and (c) jaundice, probably of bacteremic origin.

12. Acute suppurative otitis media, labyrinthitis, anomalous pointing reactions, and facial paralysis. Recovery.

The anomalous pointing reactions which were past-pointing to the left with the right hand no past-pointing with the left hand, in association with spontaneous nystagmus to the right due to left labyrinthitis, are explained in two days: There was either a cerebellar lesion that suspended the action of the centers for outward deviation of the left hand or a hyperirritability of the center for inward deviation of the left hand. Because of the favorable outcome, the author favors the latter hypothesis.

The conclusions offered by the author from a study of these cases are:

1. The diagnosis of these complications is not easy, but requires careful examination of the history, the symptoms, the functional tests and the laboratory findings.

2. In extradural abscess the most characteristic symptom is the severe one sided headache, in a patient who has or who has had a running ear.

3. In abscess of the left temporosphenoidal lobe the most characteristic symptom is the loss of memory for names, with

weakness of the facial muscles on the right side. If the abscess is in the right temporosphenoidal lobe, memory for names is not lost unless the patient is left handed, in which case it might be lost. Right sided facial paralysis may be present.

4. If the patient has a labyrinthitis, complete labyrinthine deafness, anomalous pointing reactions, headache, choked disc, look out for cerebellar abscess, and when exploring for it, remember that the abscess is apt to lie either near the internal meatus or over the saccus endolymphaticus.

5. If the patient has rigid neck, positive Kernig and a cloudy cerebrospinal fluid with increased polynuclear count, the diagnosis of purulent meningitis is settled.

6. In the cases of thrombosis of the superior longitudinal sinus there is a lack of mental ability, an inability to comprehend what is said and to reply, that is quite characteristic when once seen but which is difficult to describe. Nose bleed is a symptom of considerable importance in the diagnosis of this complication.

7. Syphilis of the vessels, syphilitic meningitis and gumma usually lack the preceding middle ear suppuration. The symptoms are not apt to be confined to one side of the head, and the Wassermann on the blood and cerebrospinal fluid gives an indication of the cause of the symptoms.

8. When in doubt it is probably better to explore the brain, best done by means of the double bladed explorer, similar to the one devised by Gifford of Omaha.

Hastings reports two ear cases with intracranial complications. The first one was a honeycombed caries of the petrous bone, secondary to chronic middle ear suppuration, causing meningitis and death. At autopsy the condition was discovered only after stripping the dura from the petrous bone. In this case the petrous pyramid was unusually cellular, thus accounting for the spread of the suppuration in this direction. The second case was one of temporosphenoidal abscess secondary to chronic middle ear suppuration, successfully operated eight years ago. There was a recent attack of dizziness; demonstration of fistula in the horizontal semicircular canal; reoperation; caries of labyrinthine walls found; recovery after a radical mastoid operation.

VII.—Diseases of the Internal Ear.

1. Gluck, Charles.—Common Deafness: Its More Accurate Handling. Med. Rec., N. Y., 1918, XCIII, 410.
2. Mackenzie, G. W.—Syphilis of the Inner Ear and Eighth Nerve. Am. J. of Syph., 1918, II, 241.
3. Mackenzie, G. W.—The Report of a Case of Neuritis of the Eighth Nerve Involving Both Branches, from a Focal Infection in the Appendix. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 490.
4. Mygind, S. H.—A New Symptom of Labyrinth Fistula. J. Laryngol., Lond., 1918, XXXIII, 143.

Rott, O. M.—The Clinical Interpretation of Labyrinthine Phenomena in the Presence of Suppurative Inflammation of the Middle Ear. Northwest Med., Seattle, February, 1918.

Gluck divides nerve deafness into two types:

1. Disease of the vestibule or cochlea, which is actually disease of the auditory nerve filaments or endings.

2. Disease of the auditory nerve itself, or auditory brain centers or both.

The former, the most common, is due to involvement of these structures by extension of similar inflammatory processes working through the middle ear and is to be treated by attention to the abnormal conditions in the nose and throat.

The latter, the rare type, is caused by disease gaining entrance through the blood.

Mackenzie offers a contribution to the subject of syphilis of the inner ear and eighth nerve. The points of chief interest to which the author draws attention are:

1. That syphilitic changes in the inner ear are due to extension from either the nerve on the one side or the middle ear on the other.

2. From our present knowledge, we may accept (a) primary atrophy of the eighth as well as the second nerve as an accompanying manifestation of parasyphilis; (b) primary atrophy is produced by a pre-existing low grade syphilitic meningitis; (c) eventually the pia mater contracts and squeezes the life out of the nerve.

3. In those cases where the syphilitic meningitis is more pronounced the inflammation spreads to and involves the nerve, so that the clinical evidence of neuritis manifests itself simultaneously with or shortly following the meningitis. At

a later period the connective tissue elements in the nerve may contract and produce secondary atrophy.

4. Bilateral diminution or complete loss of hearing, when found to be due to a lesion of the perceiving apparatus as determined by carefully conducted functional fork tests, speaks decidedly for the diagnosis of syphilis.

5. Bilateral diminution or loss of the socalled turning, caloric and galvanic tests likewise speaks for syphilis.

6. Bilateral diminution or complete loss of hearing function from a lesion in the perceiving apparatus combined with bilateral diminution or loss of vestibular function speaks for syphilis.

7. Pronounced loss of either function on one side with but moderate diminution of function on the other speaks equally strong for syphilis.

Mackenzie reports an interesting case of neuritis of the eighth nerve which was due to a focal infection in the appendix.

Mygind describes a new symptom of labyrinth fistula which consists in a nystagmus to the healthy side when the carotid of the diseased side is compressed, followed in a short time by cessation of the nystagmus, and finally a nystagmus to the diseased side when pressure on the carotid is released. This symptom has been observed in four cases.

Rott emphasizes that when spontaneous labyrinthine phenomena occur in the course of suppurative inflammation of the middle ear, the decision concerning the advisability of a mastoid operation rests largely on the question as to whether the type is a paralabyrinthinitis or an acute diffuse labyrinthitis, and, if the latter, whether there are or are not symptoms of meningeal involvement. If, for instance, during the course of a suppurative inflammation of the middle ear, the patient should complain of vertigo, nausea and vomiting, and an examination of the eyes revealed the presence of a nystagmus (that is, the quick component) toward the diseased ear, with deafness not absolute, the condition would be a paralabyrinthitis and the best treatment would be the prompt opening of the mastoid.

If, on the other hand, there was absolute deafness of the suppurating ear, with the nystagmus directed toward the well

ear, the condition would be one of diffuse labyrinthitis, and the best interests of the patient would be served if we refrain from opening the mastoid during the acute stage, unless there are unmistakable evidences of beginning meningeal involvement, as determined by a temperature of over 100°, headache, photophobia, exaggerated reflexes, a positive Kernig, and positive findings in the cerebrospinal fluid.

Before undertaking a mastoid operation in chronic suppurative otitis media, the labyrinth should be tested, and if found nonfunctionating, it would be safer to follow the mastoid operation immediately by a labyrinthine exenteration rather than to perform the mastoid operation alone.

VIII.—Injuries.

1. Jones-Phillipson, C. E.—War Injuries and Neuroses of Otological Interest. J. Laryngol., Lond., 1918, XXXIII, 77 and 111.
2. McBride, P., and Turner, A. L.—War Deafness, with Special Reference to the Value of the Vestibular Tests. Lancet, London. 1918, CXCV, 73.
3. Richardson, C. W.—Ear Protectors. Laryngoscope, St. Louis, 1918, XXVIII, 514.
4. Wilson, J. Gordon.—The Effect of High Explosives on the Ear. N. York M. J., 1918, CVII, 357.

Jones-Phillipson has analyzed 100 cases of war injuries to the ear.

There were thirty-one cases of laceration of the membrana tympani. Various degrees of laceration of the external ear were commonly seen—slits, perforations or nearly complete severance of the auricle. They healed well and quickly. Two cases of severe perichondritis of the auricle with abscess formation were seen. There were four cases of firm blood clot in the middle ear, bulging the membrane outwards. An analysis of the symptoms, presented in order of frequency are:

1. Deafness, increased deafness, "dullness in ears."
2. Noises in great variety (singing, buzzing, hissing, straining, thumping, bells, throbbing, ticking).
3. Giddiness, dizziness, "dazed."
4. Pain, soon passing off.
5. Bleeding, at the time, or noticed soon after.
6. Staggering gait, inability to walk, unconscious, dumbness, blindness.

Analyzing shell concussion effects on the internal ear, the author observes that the membrana tympani is of much greater area than that of the fenestra valis. The ossicles convey vibrations from the large area to the small; much greater force must therefore be applied to the small area. Different effects on the internal ear are to be expected if the full force has been transmitted to the fenestra valis, the membrana tympani having withstood the force of the concussion, and a less effect if the membrana tympani has been lacerated, much of the force being lost; and in cases of otitis media suppurativa with large losses, where the remains of the membrana tympani and the diseased condition of the contents of the middle ear have been much minimized in value as transmitters.

Shell concussion deafness is probably due to three contributory factors:

1. Cerebral concussion.

2. Overstrain and fatigue of the organ of Corti; the former being due to violent oscillations of the perilymph communicated to the organ of Corti, and the latter to continuous violent noises or explosions at close quarters.

3. Temporary or permanent disorganization of the conductive apparatus.

The prognosis depends on the recovery of these parts.

1. The patient experienced a great shock, and was, in many instances, buried. He became suddenly deaf, and often dumb also. In other cases he could not see, or had paresis of arm, leg, or both legs. Here the higher centers were temporarily involved. One watched the almost sudden improvement in hearing in a few days as shock passed off, and the disappearance of nervous symptoms generally when the patient was removed from the firing line.

2. A portion of deafness remains to be more or less slowly recovered from by the return of the internal ear to a normal or nearly normal condition.

3. Structural damage must leave a permanent imperfection of function—a ruptured membrane, a dislocation, partial or complete, of the small bones from one another, or the stretching of their attachments to the tympanic wall.

McBride and Turner have reached the following conclusions concerning war deafness and the value of the vestibular tests:

1. That concussion deafness is generally due to some organic change.

2. That the prognosis is usually bad.

3. That the results of the vestibular tests can only be utilized in conjunction with information derived from other sources. Thus, if the patient shows other hysterical symptoms vestibular tests may perhaps under certain circumstances help diagnosis; but to state that they do more than this is misleading and dangerous.

With a view to determining the relative merits of the various ear protectors against concussion deafness, Richardson has had experiments made on animals, from which he has deduced the following conclusions:

1. Of the four protectors tested (British Tommy, Mallock-Armstrong, Baum, and Wilson Michelson), the British Tommy is the best.

2. Cotton is efficient only when moistened with glycerin or vaselin. It deafens the wearer more than the Tommy.

3. It is recommended that several thousand Tommy protectors be purchased and issued to the troops with orders to wear them the same as their gas masks.

4. It is recommended also that cotton saturated with glycerin and vaselin be issued to a certain number of men, so that the relative merits of the Tommy and vaselin cotton can be determined.

Wilson discusses the effect of high explosives on the ear and divides the cases of deafness due to war conditions into two classes, one including all cases in which there had been a direct wound of the ear by a missile and the other including those injured by the effects of an explosion without direct wound of the ear. It is the latter class alone which the author considers. These cases had been termed shell shock deafness, and there had been a great tendency to associate the condition with hysteria and neurasthenia,. but the author advises the avoidance of these terms as confusing.

The effect of a high explosive was a great and sudden compression followed by an equally great and sudden decompression. This compression and decompression could amount to 10,000 kilograms a square meter. The author referred to the fact that there were certain normal limits to the capacity of

the auditory apparatus to withstand pressure changes, and that pressures beyond the normal caused disturbances of hearing such as hyperacusis, hypoacusis, or total deafness.

The men with symptoms of nerve deafness due to the effects of high explosives could be classified as those with true nerve deafness; those who had had nerve deafness and who retained the fixed idea that they could not hear: and those who were malingering. The first class alone is discussed, and in this class there are three groups of cases.

(a) In the first group, the nerve deafness was associated with damage to the conducting mechanism, such as perforation of the tympanic membrane, hemorrhage into the middle ear, or infection of the middle ear.

(b) The second group comprised those cases in which there was no demonstrable lesion in the conducting mechanism.

(c) The third group was composed of those cases in which there was destruction of the cochlea and semicircular canals or their nerves.

The deafness might be partial or total in either of the first two groups, but was always total in the third. The symptoms of all three groups fell within the description of traumatic neuroses, and most of the patients exhibited variable and complex symptoms aside from deafness. Such symptoms included the various common manifestations usually associated with neurasthenia or hysteria.

The author pointed out that in those cases where there were no evidences of structural injury there still might be some microscopic damage to the structures of the internal ear. In this connection the author reported on two specimens, secured within six hours after death, in which it was known that the patient had sustained the effects of high explosives and developed nerve deafness. The microscopic examination revealed lesions confined to the cochlear structures, closely resembling the experimental lesions made on animals by pistol shots. The membrana tentoria was found swung up against Reissner's membrane and was attached to it by a serous and cellular exudate. The organ of Corti showed marked swelling of the cells, and microscopic hemorrhages were found in the internal ear alone, with evidences of an acute neuritis of the eighth nerve. No hemorrhages were found in Corti's organ.

With these lesions it was found that the stapes was intact and the vestibule had not been injured.

Concerning the methods employed for improving the hearing, the best results were obtained by stimulating the nerves by means of the voice and tuning forks through resonators. Electricity was harmful. No results were obtained where the internal ear was destroyed.

As a preventive measure the author recommends the Wilson-Michelson hard rubber device, which permitted the hearing of all normal sounds, but which also closed tightly in response to loud noises and protected the ear against injury by detonations. This device was smaller than the Malloch-Armstrong protector and did not irritate the canal or cause any discomfort to the wearer. Cotton plugs and wax or cotton impregnated with petrolatum were condemned.

IX.—Education of the Deaf.

1. Blake, C. J.—Speech Reading for the War Deaf. Boston M. & S. J., 1918, CLXXIX, 697.
2. Morgenstern, Louise I.—The Medical Profession and the Deaf. Laryngoscope, St. Louis, 1918, XXVIII, 612.
3. Scripture, Mrs. May K.—Abnormal Voices: Falsetto, Nasality, Hoarseness, Cleft Palate Speech, Choreatic Speech, Anarthria, the Voice of the Deaf, and the Mental Deficient. Laryngoscope, St. Louis, 1918, XXVIII, 457.

Blake presents an interesting discussion of speech reading for the war deaf, emphasizing the place it should occupy in the rehabilitation of the deaf soldier and sailor. Granting that instruction in speech reading should be under the direction and control, firstly, of the General Medical Staff, and secondly, of the medical staff of the hospital or other institution in which the teaching is applied, Blake asserts that this teaching, in order to achieve its highest physiologic, as well as its most immediate practical value, should stand in a class by itself like the vocational training; not a part of the hospital treatment of the disorder from which the patient is recovering, but the first step toward the resumption of the individual place in civil life.

This educative rehabilitation which, while it may begin in the hospital ward, is distinctly a pedagogic process and should

be mentally differentiated as such, since, when so regarded, it becomes a stimulus to the effort to get into the competitive activities of existence again.

Miss Morgenstern points out the invaluable aid of lip reading to the deaf, not only in teaching the deaf to understand what cannot be heard, but also in reconstructing the entire mental life and habits.

The medical profession as a whole is taken to task for the half hearted interest displayed and the perfunctory advice given to their deaf patients, and a plea is made for closer cooperation between the physician and those giving their time to the work.

Mrs. Scripture lays down the following lines along which speech development in the deafmute should proceed:

1. Breathing through the nose and mouth are first taught. The teacher breathes through the nose on a slate or a mirror and shows the two moist spots; the child learns to imitate this. The mouth breathing produces one spot.

2. The low position of the tongue is necessary for proper speech. It is taught by showing the position and using the mirror, and by breath exercise. This latter rests upon the fact that the child cannot produce a good sized spot on the slate unless he keeps his tongue down.

3. Tongue gymnastics are next used to limber up and train the muscles which have never received the proper development. The tongue is protruded, retracted, moved to each side, turned up, etc.

4. Tongue training preparatory to various consonant sounds is introduced. For example, the child is taught to put the tip of the tongue against the upper teeth; this gets him ready for the letter "t." He learns to draw it back and close it against the hard palate, thus getting ready for "k."

5. Vibration of the vocal cords is taught by feeling. The pupil puts his hand on the teacher's chest and also on his own. He thus learns to make a tone. He learns to raise the voice, and by careful drill is able to make a fairly good tone.

6. The physiologic alphabet consists of a set of diagrams giving the typical position of the tongue and lips for the chief sounds of the language.

7. Combinations of consonants and vowels are now read at sight. Through these combinations words and sentences are developed.

8. Lip reading of words and sentences are taught by having the patient watch the teacher's lips while she distinctly enunciates some word. Thus he learns to pick up objects off the table, etc.

X.—Miscellaneous Topics.

1. Davis, G. E.—The Importance of Recognizing the Relation of Ear Conditions to the General System. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 226.
2. Harris, T. J.—Radium in Diseases of the Ear. Ann. Otol., Rhinol. & Laryngol., St. Louis, 1918, XXVII, 986.
3. Kobler, E. Willis.—A Survey of Ear Conditions in School Children. N. York M. J., 1918, CVIII, 66.

Davis reports three cases of aural symptoms, in which a complete functional examination disclosed the absence of any local trouble, but in which the general system was at fault. In two cases a general syphilitic infection gave rise to the aural complaint because of neuritis of the eighth nerve. In the other case vertigo was due to thyroid trouble.

Harris reviews the literature on the influence of radium in diseases of the ear, and offers the following conclusions:

"Radium up to the present time has failed to be of any considerable benefit in the treatment of diseases of the ear. So far as chronic deafness is concerned, it has proved virtually a failure. In the rare cases of intractable tinnitus and excessive vertigo, on the other hand, it can be employed with a reasonable hope of relief by its power of destroying the labyrinth. Finally, so far as malignant growths are concerned, it is of value when they are superficially seated. When deep seated, there is nothing sufficiently encouraging to be said of it to warrant its use to the exclusion of operative measures where they can with propriety be adopted. The work that has already been done with it on the ear is not enough to condemn it "in toto," however, and it is to be hoped that other investigators will take it up and give it further thorough and careful trial.

Kobler has examined the ears of 500 school children and found that 64 gave a history of some previous ear discharge;

9 had skin lesions, malformations, etc., of the external auditory canal and adjacent structures; 152 showed relative degrees of impairment of hearing; 285 had cerumen in relative degree of excess over normal; 8 had a present ear discharge and 59 exhibited marked associated defects bearing relatively upon the condition of hearing.

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XLIII.

A STUDY OF ONE HUNDRED CASES OF SUSPECTED CHRONIC NASAL ACCESSORY SINUS DISEASE WITH A REPORT OF THE X-RAY FINDINGS.*

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In going over the literature of the radiography of the nasal accessory sinuses I have been impressed with the many diverse opinions and reports expressed concerning the accuracy and value of the procedure. It is with the hope of contributing somewhat to the clarification of the results to be expected that I report this series of cases.

Roentgenography of the nasal accessory sinuses is essentially a shadow transposition of the differential densities of the bones of the skull as modified by certain diseases or conditions, such as—

1. Age—In infancy there are numerous modifying conditions—for example, size, shape, development, etc., of the sinuses and bones of the skull.

2. Sex—Men are apt to have thicker or heavier bones than women.

3. Disease—Such as loss of lime salts.

4. Thickness of bone of face and skull. This may be a localized thickening, an unilateral or bilateral thickening.

5. Asymmetry of the sinuses or bones of the skull.

6. Altered mucous membrane. This may take the form of an excessive thickening due either to infection or as a post-operative result, or the alteration of the mucous membrane may be an extreme thinning or atrophy.

7. Inflammation or suppuration within the sinuses.

8. Inflammation or suppuration adjacent to the sinuses.

*Read before the Chicago Laryngological and Otological Society, March 3, 1919.

9. Tumor formation involving the region of the sinuses or the sinuses itself.

10. Angle of exposure—Various dense structures, such as the petrous portion of the temporal,[1] the vertebræ, or the base of the skull may be projected in line with the sinuses, obscuring and interfering with the proper reading of the plates.

In view of the above modifying conditions, it is illogical to assume that a diagnosis can be made from the plates alone. A secondary place perhaps should be given to the X-ray, and the main reliance should be placed on clinical means. Caldwell[2] was the first to show that the contents of a sinus, whether pus, normal salt solution or water, offer about the same degree of obstruction to the X-ray. Beebe[3] arrived at the same conclusion after injecting the sinuses with liquids of varying densities from water to thick pus. Differentiating between a pus filled sinus and a neoplasm is not always easy, although the neoplasm usually involves other structures as well, which somewhat simplifies the diagnosis.

The angle or plane of exposure is important and should be governed by the sinus or sinuses suspected. The custom largely prevalent in the past and at present is to have one sagittal (posterior anterior) view and one lateral view. When the expense is to be considered, this perhaps will give as much general information as any other two views, but the objection to these is that in the lateral view the ethmoids and sphenoids are superimposed upon the opposite sides, and their outlines are confused or blurred. In the posterior anterior views the ethmoids and sphenoids are superimposed, and an intelligible reading frequently rendered impossible.

An excellent procedure, in my opinion, when general information concerning all the sinuses is desired, is to have three views, one posterior anterior (Caldwell) and two obliques (Rhese). In the posterior anterior view the tip of the nose and the forehead touch the plate. The rays are passed from near the occiput at right angles to the plate. The right and left oblique views are taken as first described by Rhese.[4] In the oblique position the object is to project the sphenoids and the posterior ethmoids through the orbit. To accomplish this the tip of the nose, the brim of the orbit and the malar bane touch the plate and the rays enter the parietal

region about two inches posterior and one and one-half inches superior to the external auditory meatus. This should project the optic foramen near the center of the orbit. To the median side and below is the sphenoid sinus. Above the rim of the orbit is the frontal sinus. The ethmoids occupy the space below the frontal and extending posteriorly to the sphenoid.

For the frontal sinus alone the Caldwell position is ideal. If operative interference is anticipated this position should be supplemented with a lateral view, so that information concerning the depth of the sinus can be obtained.

For the ethmoids, as stated above, I prefer the oblique position of Rhese. Both sides should be taken for comparison.

If a picture of the antrums alone is wanted, an excellent view is obtained from the extended chin position first described by Waters[5] and Waldron[6] in which the petrous portion of the mastoid falls below the floor of the antrum. This position is obtained by having the chin of the patient touch the plate and the tip of the nose from one to one and one-half cm. from the plate. In a concave face an increase of one-half cm. in the distance of the nose from the plate is required. This position gives a slight distortion of the frontal sinuses, due to the distance from the plate. The posterior ethmoid cells are shown below the anterior group. This can be demonstrated by means of bismuth paste or metal clips.

A satisfactory view of the sphenoid is sometimes hard to get. Pfeiffer[7] has described a method whereby the two sphenoids are shown side by side. The patient extends the chin forward over the plate, and the central rays pass vertically through the head in the median line at a point 2 c. m. in front of the external auditory canal. Bowen[8] places the plate on top of the extended head and passes the rays from below up. A combination of lateral, oblique and vertical views will usually give enough information to greatly assist in the diagnosis.

Beebe[3] calls attention to the fact that the blurring or hazing of the sinus outline is of more diagnostic import than the shadow cast. He bases his objection to the roentgenogram taken stereoscopically on this fact. I believe this is especially true in acute sinus infection before any mucous membrane changes have taken place, but where changes in the

mucous membrane have occurred or where we are dealing with tumor formations the shadows cast are of diagnostic import.

In the 100 cases reported, the X-ray shows 28 were negative. Of these 28 cases, all but one (case No. 48) showed no clinical evidence of sinus disease. This case where the X-ray showed negative and in which a possible clinical diagnosis of sinus disease might be made was in a young man age twenty years, who one year ago complained of some stuffiness of the nose without any nasal discharge except an occasional acute rhinitis. At this time he visited a free dispensary, where the left middle turbinate was removed. Since the operation he has had an excessive amount of thick, heavy mucopurulent discharge with large crusts from the left side. At the time I examined him (one year later) I found a condition very closely resembling a chronic atrophic rhinitis on the left side. Considerable scar tissue in the region of the middle meatus was present, the nasal mucous membrane covered with a thick mucopurulent secretion with some crusts. The possibility of the purulent secretion originating from the sinuses being present, X-ray plates were taken which failed to show any sinus disease. A diagnosis of atrophic rhinitis of traumatic origin was made.

Of the 72 cases in which the X-rays revealed a cloudy sinus or sinuses, 36 were confirmed by surgical means, 21 were confirmed by clinical means other than surgery, 4 were postoperative—that is, plates taken from two weeks to six months after the sinus operation without unusual postoperative symptoms, leaving 9 cases in which the sinuses were cloudy, but which showed no clinical evidence of sinus disease. Of these nine cases the plates showed part or all of the ethmoids cloudy in four cases (Nos. 83, 84, 91 and 99). At the time of examination no evidence of ethmoid disease could be found, although all gave a history of having had former attacks of acute rhinitis with a watery or a mucopurulent discharge.

In one of the nine cases, a patient with hay fever (No. 16), the plates showed the left antrum and ethmoid cloudy. At the time of examination (July 14th) a slight congestion of the nasal mucosa with some watery secretion was observed, but no more evidence of a sinus involvement could be found. The

cloudy antrum and ethmoid could be explained through some former involvement which left a thickened mucous membrane. In another case (No. 82) the right sphenoid was cloudy with no clinical evidence of disease. The sinus was not opened and hence confirmation was not made. He had had a previous sinus involvement in which the right antrum had been opened.

Of the three remaining cases the plates revealed dark antrums. One (case No. 25) had had a cyst removed from the floor of the antrum about ten years ago. The antrum was reopened and no trouble other than a thickened mucous membrane was found. The second antral case (No. 30) had had a former antrum operation about one year ago. The plate showed a cloudy antrum, but in the absence of any clinical findings and in view of the fact of his having had a former antrum operation the antrum was not opened.

The third antral case and the last of the nine cases which were not confirmed by clinical means was case No. 8, who had had a tooth filled two years ago, since which time he has had a root abscess and later a continuous discharge from the tooth cavity. Pain, tenderness and swelling over the region of the antrum. No nasal discharge and no evidence of pus within the nose. Investigation revealed a clear antrum but a subperiosteal abscess over the region of the canine fossa, which evidently was the factor producing the cloudy appearance of the antrum.

It is interesting to note from a study of the cases (see Table 1) that where the chief symptoms were a constant nasal discharge without pain or headache, there were twenty-three cases (23 per cent); three of these (12½ per cent) were negative, and twenty (87½ per cent) showed cloudy sinuses. Of the positive cases three (cases Nos. 25, 82 and 84) were not confirmed. In those patients where the chief symptoms were a constant nasal discharge with pain or headache, there were seventeen cases (17 per cent). All of these, or 100 per cent, showed cloudy sinuses. One case (No. 19) was not confirmed.

In the group where a nasal discharge was absent, but pain or headaches present, there were thirteen cases (13 per cent). Eleven (84 2/3 per cent) were negative and two (15 1/3 per

cent) were positive. Neither of these positive cases (Nos. 8 and 30) was confirmed.

There were six cases (6 per cent) of intermittent nasal discharge. Four (66 2/3 per cent) were negative and two (33 1/3 per cent) were positive.

The chief complaint in ten cases (10 per cent) was a post-nasal discharge. Six (60 per cent) of these were negative and four (40 per cent) were positive. One of the positive cases (No. 83) was not confirmed.

There were nine cases (9 per cent) whose chief trouble was a constant or intermittent nasal hydrorrhea. Three (33⅓ per cent) of these were negative and six (66⅔ per cent) showed sinus disease. Of the six positive cases, one case (No. 99) was not confirmed. Six cases (6 per cent) suffered from asthma. One patient (16⅔ per cent) had negative sinuses, the remaining five cases (83⅓ per cent) were positive. Tumor formation other than polypi was present in seven cases (7 per cent). All (100 per cent) revealed cloudy sinuses on the affected side. There were four sarcomas, one carcinoma, one lymphoendothelioma, and one fatty cyst of the frontal sinuses and orbit. Six cases (6 per cent) had a polypoid degeneration. All (100 per cent) showed one or more sinuses cloudy. One case (1 per cent) was interesting inasmuch as the polyp which was filling the posterior portion of the inferior meatus apparently had its origin from the antrum. There were two (2 per cent) of chronic atrophic rhinitis (ozena); one case (1 per cent) of hay fever. All three cases were positive, although confirmation was not obtained in the hay fever patient (case No. 16). One case (1 per cent) was taken about six months after both sphenoids had been opened and the middle turbinates removed, incidental to an acute infection of the antrums and sphenoids. At the time the plates were taken there were no symptoms or clinical evidence of trouble. The plates showed the outlines of the sphenoids and antrums were not clear.

CONCLUSIONS.

1. The chief difficulties in deriving the full benefits of the roentgenogram properly taken and developed are (a) reading the plate—that is, determining the presence or absence of ab-

normal shadows or outlines; (b) having properly interpreted the plates, the correlation of these findings to the clinical data obtained. To do this the various modifying conditions mentioned in the first part of this paper must be considered.

2. The X-ray is a valuable supplement to clinical diagnosis, and when so combined, error in diagnosis is reduced to a minimum.

3. Valuable surgical information can be gained as to the presence or absence, size, shape, depth, etc., of the sinuses.

4. Thickenings of the mucous membrane of the sinuses, due to former operations, infections, irritations, etc., will produce a cloudy appearance or an indistinct outline of the sinus in the plate.

5. As a guide to the postoperative progress the X-ray is of little assistance in the chronically diseased sinuses.

6. The X-ray is usually essential to determine the fact that the involvement is confined to certain sinuses, sinus or part of a sinus.

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Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
1 Mrs. H.	Frequent colds; nasal discharge; complete nasal stenosis right side	Colds and discharge for years; stenosis for two months	Cloudy right antrum; outline indistinct	Fibrous polyp filling inferior meatus apparently arising from right antrum; polyp removed
2 P. W. H.	Profuse nasal discharge, worse left side. Bad odor. Began one year ago following ulcerated tooth	One year	Cloudy left frontal, ethmoid and antrum; outline indistinct	Pus emerges from middle meatus; odor; operation refused
3 Mrs. C.	Mucopurulent discharge left side; complete nasal stenosis left side	Two years; complete stenosis last two months	Cloudy left antrum	Sarcoma left antrum and nasopharynx; mucous membrane of antrum ulcerated and thickened
4 D. C. H. D.	Occasional mucopurulent discharge	Years	Negative	No evidence of sinus disease; hypertrophic posterior ends of inferior turbinates
5 D. A.	Nasal discharge and odor at times; headaches; polypi have been removed at times	Years	All sinuses cloudy; outlines indistinct	Exenterated ethmoids; polypoid degeneration; Mosher operation on frontal; sphenoid opened; antrum not opened
6 E. S. C.	Nasal discharge, pain over eye and side of nose for two months	Discharge for years; pain for two months	Cloudy left antrum; outlines indistinct	Operated on antrum; findings not recorded
7 H. C. B.	Postnasal discharge; frequent colds; acute rhinitis at present	Years; present rhinitis three weeks	Right ethmoid cloudy	Mucopurulent discharge from the region of both middle turbinates; slight odor; cleared up under treatment; subsequent plates clear
8 E. H. B.	Pain in right superfor maxillary region since filling of a tooth two years ago. Has had gumboils from tooth	Two years	Right antrum cloudy and outline indistinct; abscess at root of tooth	Antrum opened; pus found
9 U. H.	Nasal discharge left side; worse last two weeks	Years	All sinuses cloudy on left side; outline indistinct	Antrum opened left side; pus found; thickened mucous membrane
10 D. D.	Purulent discharge left side; pain and headache over left frontal. Began with nasal cold	One month	Cloudy left frontal and left anterior ethmoid	Tenderness over left frontal; pus emerging from beenath anterior portion of left middle turbinate; transillumination of antrums clear
11 Mr. D.	Complete nasal stenosis on right side; odor and discharge	Six months	Nasal cavity and right anterior ethmoids cloudy	Carcinoma of nose; operation; involvement of nasal cavity, septum and ethmoids on right side; skin around aperture of nose involved

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
12 Mrs. H.	Asthmatic symptoms; frontal headache	Nine months	Cloudy right ethmoids	Ethmoids exenterated on right side; hyperplastic type
13 Miss C.	Asthmatic symptoms; mucopurulent discharge alternating stenosis; has had both middle turbinates removed	Three years	Cloudy anterior ethmoids, both sides	Both groups of anterior ethmoid cells exenterated; small polypoid degeneration found on left side; right side hyperplastic
14 Mrs. B.	Nasal hydrorrhea on left side; frequent headaches above left eye	Six months	Cloudy left bulla ethmoidalis	Bulla opened and surrounding cells curetted; mucous membrane of cells thickened
15 Miss P.J.D.	Frequent head colds and sore throat	Years	Negative; left frontal rudimentary	No evidence of sinus disease; tonsils enlarged with infected crypts
16 Miss F. D.	Sneezing and watery discharge (hay fever)	Fourth season	Left antrum and ethmoids cloudy	Findings not confirmed; no operation; pus not found; mucous and serum present in nasal cavities
17 C. M. B.	Mucopurulent discharge both sides; dull frontal headaches frequently; sneezing	Six years	Cloudy left anterior ethmoids; slight cloudiness of right anterior ethmoids	Left ant. ethmoids exenterated; mucopurulent involvement
18 P. B.	Constant head colds following partial removal of tonsils and adenoids three years ago	Three years	Left posterior ethmoids cloudy	Mucopurulent secretion found; no operation
19 D. B.	Mucous discharge and slight crusting; epipharyngeal soreness; partial nasal stenosis	Years	Negative	No evidenec of sinus disease; deviated septum; some adenoid tissue present
20 Dr. S. J. B.	Headache since removal of tip of left middle turbinate.	Months	Negative	No evidence of sinus disease
21 R. R. B.	Nasal discharge on right side	Months	Right ethmoid cloudy	Opened ethmoid cells right side; pus found
22 E. B.	Nasal discharge; frequent polypi; asthmatic symptoms	Four years	All sinuses cloudy and outline indistinct	Polypi present; pus in both middle meati; pus found in antrums and ethmoids; thickened mucous membrane; frontals and sphenoids not opened
23 B. L. B.	Asthmatic symptoms; partial nasal stenosis. Has had left middle turbinate removed. Has has some nasal discharge at times	Years	Negative	No evidence of sinus disease; enlarged middle turbinates and tonsils removed; asthma greatly improved

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
24 S. A. C.	Mucopurulent nasal discharge	Months	Right antrum very cloudy and outline indistinct; left antrum slightly cloudy	Right antrum opened; pus and thickened mucous membrane
25 Mrs. D.	Nasal discharge. Had cyst of right antrum removed ten years ago	Years; worse last two months	Right antrum cloudy and outline indistinct	Right antrum opened; mucus found; membrane thickened; no pus
26 Miss P.	Postnasal discharge since removal of right middle turbinate two years ago	Two years	Negative	No pus observed; deflected septum; chronic lacunar tonsillitis
27 D. C.	Purulent discharge left side of nose; crusting in epipharynx	Years	Right anterior ethmoids cloudy	Curetted anterior ethmoid cells and opened agar nasi cell; no record of condition of cells
28 D. D.	Frontal and occipital headache. Had submucous resection four months ago which gave some relief	Years	Negative	No evidence of sinus disease; middle turbinates in firm contact with septum
29 Mrs. McE.	Frontal headaches. Occasional purulent discharge	Three years	Negative	No evidence of sinus disease; both middle turbinates in contact with septum
30 Mrs. H. D.	Dull headache, supraorbital and occipital. Has had operation on left antrum one year ago. No discharge at present	Three months	Left antrum cloudy	No evidence of pus in nose; antrum not opened
31 Miss D.C.F.	Postnasal discharge of clear mucus; frequent head colds and sore throat	Years; worse last five months	Left ethmoid and antrum slightly cloudy; outline indistinct	Mucopurulent discharge in postnasal space; hypertrophic tonsils; deviated septum
32 Miss B. G.	Excessive mucopurulent discharge; crusts, odor (ozena). Has had left antrum opened and both ethmoids curetted	Years	Left posterior ethmoids cloudy; left antrum is not as clear as right	Left ethmoids curetted; mucopurulent secretion; membrane atrophic; antrum found radically opened; whitish secretion lining antrum
33 Mrs.J.A.G.	Occasional frontal headache and constant feeling of stiffness in eyeballs	Months	Negative	No evidence of sinus disease found
34 G. A. H.	Headache in right frontal and right orbital region. Purulent nasal discharge right side. Partial deafness right ear	Months	Right frontal and right ethmoid cloudy and outline indistinct	Mosher operation on frontal sinus and ethmoid; pus found; cells soft and easily broken down; pus discharge profuse
35 J. H. G.	Postnasal mucous discharge; frequently yellow color; occasional occipital headaches	Years	Negative	No evidence of sinus disease

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
36 Mrs. H.	Small amount mucopurulent secretion; occasional occipital headaches; partial nasal stenosis; frequent attacks of epipharyngitis	Years; worse lately	Right sphenoid cloudy; left uncertain	Mucopurulent discharge in posterior of nasal cavity; operation refused
37 Mr. H.	Plate taken six weeks after double Killian frontal sinus operation; slight mucous discharge; feels fine	Six weeks since operation	Both frontal sinuses cloudy and outline fairly distinct	Sinus apparently healing up nicely; discharge slight
38 Mr. L.	Yellow mucous discharge; partial nasal stenosis; symptoms of asthma; has recently had submucous resection of septum	Years	Right frontal and right anterior ethmoids cloudy and outline indistinct	Mucopurulent discharge observed in middle meatus
39 Miss M.C.E.	Nasal discharge resembling continuous cold; dizzy when she stoops; occasionally has one or two degrees of temperature	Seven months	Left frontal and left ethmoid cloudy and outline indistinct	Tenderness at inner angle of orbit; pus observed in middle meatus on both sides; vaccines
40 M. P. L.	Intermittent stenosis on left side; occasional mucopurulent discharge; catches cold in head easily	Years	Left anterior ethmoids cloudy	Ethmoids exenterated; mucous present; mucous membrane thickened
41 F. K.	Mucopurulent postnasal discharge; frequent pains over bridge of nose	Weeks	Right antrum and left ethmoid cloudy; outline indistinct	Purulent secretion in olfactory fissure on right side; mucopus in epipharynx; transillumination reevals cloudy right antrum; antrum opened; mucopurulent secretion removed
42 Miss L. J.	Mucopurulent discharge from right nostril; has had right middle turbinate and ethmoid removed but no relief	Months	Right ethmoid cloudy	Mucopurulent secretion present in right nasal cavity
43 Miss M. L.	Postnasal dropping of mucus	Years	Negative	No evidence of sinus disease
44 F. M.	Complete nasal stenosis on left side for six weeks; nasal discharge especially from left; odor	Six months	Cloudy left frontal; ethmoid and antrum	Sarcoma removed from left nasal fossa and antrum; pus discharged from upper portion of nasal cavity
45 Miss R. S.	Postnasal discharge and frequent colds	Six years	Negative	Clear mucous discharge present in nasal fossa; vaccines given
46 Miss O.	Intermittent nasal hydrorrhea; hydrorrhea at at present time for three days	Intermittent for three years	Negative	Watery discharge; no pus; mucous membrane appears normal othe rthan congested

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
47 Mr. S.	Purulent discharge from right side of nose; bad odor; frontal and occipital headache; had right middle turbinate removed one year ago; no relief	Years	Cloudy right frontal and ethmoid; outlines indistinct Negative	Killian operation on right side; sinus filled with pus; membrane ulcerated and thickened
48 H. S.	Postoperative crusting and yellow mucous discharge on left side following removal of left middle turbinate	Six months	Negative	Crust present; mucous membrane pale and atrophic; scar tissue and adhesions in region of middle turbinate
49 D. A. C.	Nasal discharge from both sides; headaches in frontal region	One year	Right ethmoid cloudy; left ethmoid slightly cloudy	Right ethmoid exenterated; yellowish crust; cells contain mucopurulent secretion
50 H. P.	Severe neuralgic pain in frontal region; has had several intranasal operations without relief; has no nasal discharge	Twelve years	Negative	Clear mucous secretion in left nasal cavity
51 C. S.	Frontal headache left side; pus discharge with bad odor	One year	Left antrum cloudy	Antrum opened—pus found
52 Mrs. S.	Nasal hydrorrhea and mucous discharge; sneezing; has had polypi removal at former times	Years	Both ethmoids cloudy	Polypi removed and ethmoids exenterated; mucous membrane shows polypoid degeneration
53 R. R.	Intermittent attacks of nasal hydrorrhea	Years	Both ethmoids cloudy; right worse	Mucous membrane appears thickened in region of middle turbinate; mucous present; operation in New York; no report of findings
54 Miss M. R.	Pain and headache in right frontal region; has had right middle turbinate removed one year ago with no relief; glasses give no relief	Two years	Negative	No evidence of sinus disease
55 Dr. W. R. Mc.	Partial nasal stenosis; mucous discharge; has had polypi removed one year ago	Years	Both ethmoids cloudy; left bulla frontalis present and cloudy	Thickened mucous membrane; budding polypi; mucous discharge
56 Miss F. H. R.	Yellow pus discharge from nose, both sides; began with right frontal headache	Three months	Right frontal, left antrum and left ethmoid cloudy and outlines indistinct	Pus observed in both middle meati; tenderness on pressure over right frontal and ethmoid; operation refused
57 Dr. M.	Frontal headache worse on left side; partial nasal stenosis	One year	Negative	No evidence of sinus disease

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
58 Mrs. S.	Nasal hydrorrhea; sneezing; worse on right side	Months	Right anterior ethmoid cells cloudy	Right anterior ethmoid cells removed; membrane thickened; mucus present
59 Miss L. W.	Mucopurulent discharge; frequent acute attacks of colds and headaches	Years	Right anterior ethmoids cloudy	Mucopurulent discharge seen on both sides; mucous membrane congested and swollen
60 R. E. W.	Odor and nasal discharge from left side; frequent headaches	Years	Left antrum cloudy and outline indistinct	Left middle turbinate covered with a white pus discharge; pus removed from antrum
61 Mrs. E. A. S.	Frequent head colds; occasional nasal hydrorrhea	Years	Negative	No evidence of sinus disease
62 Dr. M.	Blood discharge from right nostril; swelling and induration in right supramaxillary region; has had polypi removed and antrum and ethmoids opened three months ago	Months	Right frontal, antrum and ethmoids very cloudy and outline of antrum and ethmoids lost	Sarcoma of superior maxilla with involvement of nasal cavity
63 Miss J. R. M.	Occasional pain over right eye	Nine months	Negative	No evidence of sinus disease
64 Miss T. M.	Crusts, odor and mucopurulent discharge (ozena)	Years	Left anterior, ethmoids slightly cloudy	Chronic atrophic rhinitis with excessive amount of mucopurulent discharge
65 R. R.	Mucopurulent discharge from right nostril; had fibroma removed from right nostril years ago	Years	Apparently a single large ethmoid cell on right side is cloudy	A portion of the anterior ethmoid cells removed; a subsequent X-ray plate shows the absence of the involved ethmoid cell
66 Miss McG.	Occasional dropping of mucous in postnasal space	Years	Negative	No evidence of sinus disease
67 I. R.	Nasal discharge; occasional odor; crust formation; occasional frontal headache (ozena)	Years	Left ethmoid cloudy	Mucopurulent discharge in both middle meati
68 J. W. N.	Pus discharge from left nostril; three weeks ago had polypi removed from left nasal cavity	Four years	Left antrum and ethmoid cloudy	Antrum opened; pus and polypoid degeneration of antral mucosa found
69 D. C. E. R.	Mucous discharge	Years	Both ethmoids cloudy; left more marked	Mucopurulent discharge; mucous membrane in region of middle turbinate thickened
70 Mrs. H. P.	Watery discharge from nose	Six months	Negative	Both middle turbinates impacted against septum; no discharge visible

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
71 Miss P.	Frequent head colds; mucous discharge	Years	Negative	No evidence of sinus disease
72 Miss S.	Mucopurulent nasal discharge on right side	Months	Right antrum cloudy and outline indistinct	Mucopurulent discharge in right middle meatus
73 Mrs. S.	Nasal discharge; pain over right frontal region; accidentally shot self through right temple; has had both middle turbinates removed	One year	Right sphenoid cloudy	Sphenoid opened; mucopurulent secretions found
74 Dr. S.	Frequent attacks of head colds	Years	Negative	No evidence of sinus disease
75 Dr. P.	Mucous discharge; impaired breathing	Years	Negative	No evidence of sinus disease
76 Dr. S.	Nasal discharge; tenderness over right eye	Six months	Right antrum, ethmoid and orbit cloudy	Sarcoma involving orbit, ethmoid and antrum on right side (autopsy)
77 W. S. S.	Frequent attacks nasal hydrorrhea; asthmatic attacks; has had polypi and ethmoid cells removed several years ago	Years	Right ethmoids cloudy	Ethmoids curetted; complete relief
78 Miss W.	Purulent nasal discharge; frontal and occipital headaches; has had external operation on left frontal and both sphenoids opened	Two years	Left frontal, ethmoid, antrum and both sphenoids cloudy and outlines indistinct	Opened left antrum; both sphenoid and left ethmoids; mucopurulent discharge; Wassermann positive
79 W. V.	Pain and headaches in frontal region; nasal discharge; has had repeated intranasal operations without relief	Years	Left frontal and left antrum cloudy and outline indistinct	Mucopurulent discharge in left middle meatus; operation refused
80 Miss L. S.	Purulent nasal discharge	Six months	Right antrum cloudy and outline indistinct	Antrum opened and pus found
81 Miss E. W.	Purulent nasal discharge; occasional pain over right eye; had left antrum opened one year ago	Years	Left antrum, frontal and ethmoid cloudy	Antrum, frontal and ethmoid opened; pus found; mucous membrane thickened

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
82 Mr. W. E. W.	Slight nasal discharge on right side; has had right antrum irrigated; no relief	Six months	Right sphenoid cloudy	Sphenoid not opened; diagnosis not confirmed
83 W. S. S.	Postnasal discharge of yellow mucous	Seven years	Posterior ethmoids slightly cloudy	Not confirmed; refused operation
84 Miss R.	Mucopurulent nasal discharge; frequent head colds	Years	Right ethmoids cloudy	Nasal cavity almost occluded by deviation of septum to right
85 Dr. C. M. M.	Has had both sphenoids opened; both middle turbinates removed incidental to an acute infection of both antrums	Six months	Sinuses clear with slight dimming of the antral and sphenoid outlines	No evidence of sinus nfection
86 Mr. S.	Nasal discharge left side	Three months	Left frontal cloudy and outline indistinct	Mucopurulent discharge in region of left middle turbinate
87 Mrs. W.	Watery nasal discharge worse on right side; occasional right orbital pain	Two years	Right anterior ethmoids and right bulla frontalis cloudy	Ethmoids removed and bulla opened; membrane thickened
88 L. W.	Supraorbital pain and headaches	Two months	Negative	No evidence of sinus disease
89 O. B.	Postnasal discharge	Years	Negative	No evidence of sinus disease
90 Miss K.	Mucopurulent discharge from nostril; occasional pain in left orbital region	Three months	Left antrum cloudy and outline indistinct	Pus discharge from beneath anterior portion of middle turbinate; pus washed from antrum
91 H. C. K.	Nasal discharge of clear mucous; frequent attacks of acute rhinitis with attacks of frontal headaches	Years	Right ethmoids cluody	Operation refused; mucous discharge; membrane over middle turbinate thickened
92 C. W.	Nasal discharge left nostril; pain over left side of face	Two years	Left antrum cloudy	Mucus in antrum; membrane thickened
93 C. B.	Mucopurulent nasal discharge worse on left side	Two months	Left frontal cloudy	Pus discharge in region of left middle turbinate

Case No.	Chief Symptoms	Duration	X-Ray Findings	Clinical Findings
94 H. M.	Pus discharge and small crust formation with slight odor at times	Years	Left antrum cloudy and outline indistinct	Pus emerging from beneath both middle turbinates; small amount of mucopurulent secretion in left antrum
95 Mrs. L.	Nasal hydrorrhea; occasional occipital headaches	Five years	Both ethmoids cloudy	Mucopurulent secretion in right superior meatus; mucous membrane of ethmoids thickened
96 Mrs. L.	Orbital pain and headaches; left antrum opened fifteen years ago	Months	Negative	No evidence of sinus disease
97 Miss B.	Frequent frontal headaches; tenderness over left frontal; dizziness on stooping	Months	Negative	No evidence of sinus disease
98 C. A.	Bulging, fluctuating swelling over region of right frontal sinus	Two months	Large triangular cloudy area involving frontal sinus and extending upwards into frontal bone	Large cyst of frontal bone filled with fatty substance
99 Mrs. L.	Repeated attacks of acute rhinitis and watery discharge	Years	Left posterior ethmoids slightly cloudy	Mucous discharge
100 Mr. F. V.	Complete nasal stenosis of left nostril; watery left eye	Two months	Dark left antrum and nasal cavity	Large round tumor mass (lymphangioendothelioma) filling left nasal fossa and left antrum; tumor removed; polypoid degeneration of antral mucosa; pus and mucous found

Chief Symptoms.	No. of cases	X-ray neg.	Per cent	Neg. cases confirmed clinically	Sinus involvem't	Per cent involved	Positive cases not confirmed	Per cent of cases not confirmed	Cases not confirmed
Constant nasal discharge without pain or headache	23	3	12½	3	20	87½	3	12½	Nos. 25, 82, 84
Constant nasal discharge with pain and headache	17	0	0	0	17	100	1	5⅘	No. 91
Pain or headache with no nasal discharge	13	11	84⅔	11	2	15⅓	2	15⅓	Nos. 8 and 30
Intermittent nasal discharge	6	4	22⅔	4	2	33⅓	0	0	
Postnasal discharge	10	6	60	6	4	40	1	10	No. 83
Nasal hydrorrhea	9	3	33⅓	3	6	66⅔	1	11	No. 99
Asthma	6	1	16⅔	1	5	83⅓	0	0	
Nasal tumors	7	0	0	0	7	100	0	0	
Polypi	5	0	0	0	5	100	0	0	
Miscellaneous	4	0	0	0	4	100	1	25	No. 16
Total	100	28		28	72		9		

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

A Case of Syphilitic Papules on the Tympanic Membrane.

MÖLLER, J.

Acta Otolaryngologica, 1918—I—211.

The patient, a mason aged twenty-one years, treated in the autumn of 1916 for primary syphilis. Besides numerous cutaneous papules on his scalp, there were also some on the tonsils. The right auditory meatus was obstructed by a luxuriant suppurating papule, and a few days later others could be seen deeper in the canal. When finally, after a month or more, the tympanic membrane could be inspected, papules were seen on its inferior surface, both anteriorly and posteriorly. Two months after the first examination there remained only a single small pedunculated papule attached to the long process of the malleus. Under treatment this also disappeared a month later. The author refers to similar cases reported by Moos, Politzer, Kirchner, Alexander and Habermann.

A. Miller.

Mastoidectomy: Postoperative Treatment by Use of Surgical Solution of Chlorinated Soda and Modification Necessary to Secure the Best Results.

POTTS, JOHN B.

J. Am. M. Ass., Chicago, 1919—LXXIII—605.

Irrigations are begun at once with a properly prepared and carefully titrated surgical solution of chlorinated soda (Carrel-Dakin solution), about one ounce to each tube every two hours. The dressings are replaced every twenty-four hours. The condition of the wound and discharge governs the frequency and amount of solution to be used during the ensuing twenty-four hours. Ordinarily no change is made in the orders for

the first two days. After this the irrigation is continued every two hours during the day, but the night period is extended to four hours. As the secretion decreases, the frequency of irrigation is diminished. Usually in from four to eight days the wound is sterile. If one has access to a laboratory, this can be ascertained by removing one of the tubes and taking a culture by the ordinary method with a platinum loop. If the laboratory is not available, one will have to use his judgment and be guided by the appearance of the wound and the amount and character of the secretion. The latter when sterile is of a serous nature and should only slightly stain the dressing. I have frequently found it unnecessary to retain both tubes longer than three days. The upper tube was then removed, the lower being retained, as it better facilitated drainage. In some cases, after four or five days, the secretion instead of diminishing became more or less profuse and of a thick, slimy consistency and brownish color. When this occurred I removed both tubes, cleansed them thoroughly, resterilized, and before reintroducing them thoroughly cleansed the wound with a hot saturated solution of boric acid or hydrogen peroxid. The tubes were then introduced to their original positions and a solution of mercuric chlorid, 1/5,000, used in the same manner as the Carrel-Dakin for a twenty-four hour period. In some cases it was necessary to repeat the mercuric chlorid for two or three twenty-four hour periods. When using the mercuric chlorid I always protect the skin by covering it with a layer of gauze saturated with zinc oxid ointment. This protection was necessary also in some cases as a protection from the Carrel-Dakin solution.

The irrigation with the Carrel-Dakin solution had one advantage which we had not anticipated. The solution passed through the antrum into the middle ear and out through the membrana tympani, thus cleansing and sterilizing this tract.

The principal advantages this mode of treatment has are:

1. It enables the operator to close the wound and still feel that he has as perfect drainage as it is possible to secure.

2. To expose the dura of the whole cerebellar fossa of the closing the wound.

3. The ultimate result is a smooth, clean scar without depression.

Emil Mayer.

A Study of Acute Mastoiditis at Fort Riley, Kansas.

SCOTT, J. R. (MAJOR), SWIFT, G. W. (CAPTAIN), HOMPES, J. J. (CAPTAIN), ALLEN, G. H. (LIEUTENANT), AND POSEY, E. L. (LIEUTENANT).

J. Am. M. Ass., Chicago, 1919—LXXII—1122.

The following conclusions are presented:

1. The prevalence of mastoiditis in army cantonments is due to a number of reasons. The new surroundings of the recruit play some part in it and constitute a predisposing cause. The presence of a locality infection and epidemics of acute contagious diseases are the chief factors.

2. Invasion of the middle ear and mastoid cells may occur by extension from the nasopharynx or directly from the blood stream.

3. The anatomic structure of the mastoid body is of importance in the prognosis of each case. Roentgenoscopy will alone determine the character of the cell arrangement.

4. For clinical purposes, mastoids may be classified as Type 1, rudimentary or cell free mastoids; Type 2, in which the cells are of the pneumatic variety and are found only below a horizontal line drawn through the upper margin of the meatal ring, as shown in the roentgenogram, and Type 3, showing small cells extending forward in the zygomatic region, high posterior cells, and many delicate cells in the tip. Type 1 mastoids rarely if ever develop acute mastoiditis, but the otitis media is the most marked of all types. In this class of cases operation reveals the sinus clinging closely to the posterior wall. Type 2 is the most serious of the three and almost always requires operation. The cells of the tip and posteriorly are of the pneumatic type. The drainage is poor, and necrosis occurs early and may be fulminating in character. Type 3 is characterized clinically by an early tenderness over the entire mastoid area, which subsides on the application of hot compresses. They drain easily and seldom require operation. Mastoiditis is associated with otitis media in only Types 2 and 3. As Type 1 may be due to faulty development or to an otitis media in early childhood, a large number of mastoids of this type are found. This accounts for many severe otitis

media cases that show no clinical evidence of mastoiditis, although a high temperature and even chills may occur.

5. Bone necrosis is the one important sign in mastoiditis which must be carefully sought. Its presence makes operation imperative. It occurs in Type 2 with little or no clinical manifestation until the tip and posterior cells become necrotic. Fulminating signs then appear. When operation is indicated it should be thorough.

6. Chloramin-T paste is a good dressing to use in the aftercare of patients.

7. Blood stream invasion may cause the mastoiditis, and with it involvement of structures within the cranium. In such cases, meningitis may be hastened by a prolonged operation. Socalled otitis meningitis is a very rare complication. Septic joints, pericarditis, meningitis, or abscess of the brain due to the primary invasion may develop, early or late, in the course of the illness. Sinus thrombosis is easily differentiated by the presence of the chill and the rapid rise and fall of temperature. Emil Mayer.

Cerebellar Abscess.

EAGLETON, WELLS P.

J. Am. M. Ass., Chicago, 1919—LXXIII—1060.

Despite the fact that 62 per cent of all cerebellar abscesses originate from the petrous pyramid, and notwithstanding the importance of the surgical localizing value of a dead labyrinth (namely, with a dead labyrinth, the cerebellar abscess is likely to be on or near the anterior surface of the cerebellum, frequently admitting of operative localization by exploration in front of the sinus), the number of cerebellar abscesses of labyrinthine or perilabyrinthine origin that are not accessible by this route is large enough to preclude its routine employment.

Similarly, cerebellar abscesses, originating from a thrombosis of the lateral sinus, while generally located on or in the posterior two-thirds of the cerebellum, are frequently so situated, either on the upper or under surface of the cerebellum, as not to be accessible by puncture from behind the sinus.

In the treatment of cerebellar abscess, to meet the surgical requirement that the operative procedure may be attended by a systematic exploration which will admit of a uniform operative localization of the suppuration and its complete evacuation, it is necessary in all cases:

1. To obliterate and doubly ligate the descending portion of the lateral sinus. The sinus, no matter how large, may be quickly obliterated and ligated by invulsing the external wall into its cavity.

2. To expose the dura of the whole cerebellar fossa of the affected side; and, as the affected hemisphere occupies a position beyond the median line, the bone over the unaffected hemisphere should be freely removed.

3. To perform a ventricular puncture in order to relieve the internal hydrocephalus.

4. Then to incise the dura as far forward as possible, the incision extending outward through the obliterated sinus and continued in whichever direction necessary.

Because of the variety of situations of cerebellar abscess as found at postmortem, no other surgical manipulation promises uniformly to locate the abscess or allow of its complete evacuation, and the introduction of drainage material within the abscess itself. Emil Mayer.

Perisinus and Epidural Mastoid Abscess Subsequent to Influenza.

BLACKWELL, HUGH B.

Medical Record, May, 1919.

The writer presents the following conclusions:

1. It is surprising to note the comparatively small number of serious cases of mastoid suppuration that have heretofore complicated influenza, when we consider the wide prevalence of the epidemic, its virulent character, and the proximate relation between the chief site of infection and the mastoid cells.

2. In cases 2 and 5 the latent manner of their development suggests the possibility of the presence of an unsuspected perisinus or epidural mastoid abscess in other postinfluenzal patients with aural disease.

3. The importance of otologic examination is clearly indicated by the histories of these patients, not only when an ear-

ache is present but in all cases of subjective aural disturbances following influenza.

4. Finally, the writer wishes to emphasize the importance, when operating upon these patients, of leaving undisturbed protective granulations underlying the sinus or brain. All macroscopic evidences of diseased bony mastoid structure should be removed. In addition to the usual technic of the simple mastoid operation, he believes in gentle curettement of the epitympanum without, of course, disturbing or dislocating the ossicular chain. He has practiced this procedure for a number of years, when performing the simple mastoid operation, with very satisfactory results.

II.—NOSE.

Asthma as a Nasal Reflex.

SLUDER, GREENFIELD.

J. Am. M. Ass., Chicago, 1919—LXXIII—589.

In his explanation of the "lower half" headache it must be assumed that in man the sympathetic nervous system has the power of transmitting, under pathologic conditions, afferent pain impulses from the nasal ganglion into the neck and shoulder, etc., though the entire argument of anatomists and physiologists at present is against this assumption. Some of the writers speak of sensory fibers in the sympathetic nervous system. These are stated definitely to be dendrites of neurons, which have their cell bodies in the posterior root ganglions; and it is asserted that they are transmitted by the sympathetic trunk merely as a pathway. Buch seems to have proved that the sympathetic nervous system in some way is capable of transmitting afferent pain impulses.

In his explanation of asthma as a nasal reflex, it must be assumed that the sympathetic nervous system is also capable of transmitting afferent impulses which are not painful sensory ones, because many patients with nasal asthma do not have any pain of any kind. If this be true, the explanation of asthma as a nasal reflex becomes possible.

It is known that the sympathetic nervous system in the nose is derived from the nasal ganglion. This receives its sympa-

thetic nerve supply from the vidian nerve, the great deep petrosal, the carotid plexus, the superior cervical ganglion, etc. If, then, the sympathetic nervous system has the power of transmitting afferent impulses, the impulse may readily be traced from the inflamed nose by way of the nasal ganglion, the vidian nerve, the carotid plexus, to the sympathetic trunk in the neck to the lower cervical and first thoracic spoken of as the stellate ganglion.

Through this ganglion pass the fibers from the second, third and fourth thoracic nerves that turn downward, being accelerator fibers from the heart, and vasomotor fibers for the lung.

In what way the impulse is transferred from the cervical sympathetic to the cardioaccelerator and pulmonary vasomotor fibers is not to be speculated on at present; nor is it possible to speculate as to which ganglion serves as the relay or transfer station for the impulse.

In this immediate association of thoughts comes also the question of sensitization. Some nasal ganglions and vidian trunks are sensitive to things that do not affect others. In two cases asthma was produced by these irritants. Probably for all hay fever patients the ganglion is sensitive to locally applied pollen extract; but if the anatomic arrangement of the sympathetic nervous system is normal, they have hay fever without asthma. Should, however, the lower cervical or first thoracic ganglion be the relay station that patient may develop the asthma. Emil Mayer.

Nasal Hydrorrhea.

THOMPSON, JOHN A.

J. Am. M. Ass., Chicago, 1919—LXXIII—587.

The differential diagnosis of nasal hydrorrhea must be made from hay fever and from the escape of cerebrospinal fluid from the nose. Attacks of nasal hydrorrhea occur at any season of the year and are not excited by pollen. The discharge of nasal hydrorrhea contains mucin and no sugar. The cerebrospinal fluid contains no mucin and precipitates Fehling's solution.

This is a rare disease with edema of the turbinated bodies as its most characteristic feature. This edema is not second-

ary to inflammations in the nose or accessory sinuses. The degenerative changes in the nasal tissues are a result and not a cause of edema.

The disease is not caused by climatic conditions or seasonal changes. It is chronic in its course, often lasting, with occasional intermissions, for years.

The nasal edema is probably a symptom of a nervous disease. Emil Mayer.

The Physiology of Sneezing.

BRUBAKER, ALBERT P.

J. Am. M. Ass., Chicago, 1919—LXXIII—585.

The act of sneezing is, in its entirety, quite complex, and may be subdivided, for convenience of presentation, into two phases, a nasal and a respiratory, both of which are reflex in character and involve two different reflex mechanisms, a nasal and a respiratory. Each mechanism consists of afferent nerves, a central mechanism, affected nerves and responsive organs.

PSYCHIC STIMULATION.

Stimulation of vasomotor, secretomotor and visceromotor centers in the medulla oblongata and spinal cord, by nerve impulses descending from the cerebrum in consequence of psychic states of an affective or emotional character, is a well attested fact. It is only necessary to recall the effects of psychic states on the nerve centers regulating the vascular and secretory phenomena preceding the discharge of saliva and gastric juice, and on the nerve centers regulating the vasodilatator and the secretomotor phenomena of the sexual organs. Paralleling these effects are the effects of the psychic states on the vasodilatator and secretomotor phenomena of the nasal organs. It has, moreover, been frequently observed that the nasal and sexual phenomena often coexist, the two not standing, however, in the relation of cause and effect but as results of the same psychic state.

PATHOLOGIC CONDITIONS.

In this presentation the attention has been limited to the consideration of the normal or physiologic condition. This,

if properly conceived, may assist in the interpretation of pathologic conditions. It is quite apparent that pathologic conditions might arise from an alteration in the way of an increase in the irritability of the afferent portion of the mechanism of the nasal phase of the reflex. Local pathologic states frequently so exalt the irritability of the nerve endings that a slight additional stimulation develops a greater number of nerve impulses than would otherwise be the case. As a result, the associated central cells are more profoundly stimulated and cause by their greater discharge of energy more pronounced peripheral effects. It not infrequently happens, also, that the nerve impulses thus developed are so numerous that they overflow their customary channels and stimulate vasodilatator, secretomotor and visceromotor centers in different levels of the medulla oblongata and the pathologic phenomena in the respiratory, the circulatory and other organs as well. Instability of the central mechanism, either in itself or as an expression of a more general nerve cell instability, the result of heredity or of dietetic or sexular excesses or other conditions may lead to similar results.

Emil Mayer.

Nasal or Sphenopalatine Neurosis.

POLLOCK, HARRY L.

J. Am. M. Ass., Chicago, 1919—LXXIII—591.

Judging from the close relationship of the ganglion to the accessory sinuses, one cannot but believe that an inflammation or suppuration in these sinuses must at times involve the ganglion itself and give rise to the neurosis which we so often find.

Clinically, we divide the neuroses into two great classes, namely, the neuralgic and the sympathetic.

The neuralgic syndrome consists of pain, intense and excruciating in character (in some, cases of milder variety), radiating to any and all points supplied by the branches of the ganglion. The typical location of the pain is over the root of the nose, in and about the eyes, over the frontal region, into the pharynx and tonsil region, in and around the ear, posterior to the mastoid, into the occiput, to the neck, the

shoulder, the arm and, at times even to the fingers. The most severe and constant pain seems to concentrate at a point about 6 mm. back of the mastoid. Not all patients present this typical picture, as usually only one or more of the named are involved; but I have seen a few cases in which all of them were affected at the same time. In practically all of these types of cases the pain just posterior to the tip of the mastoid is present.

One of the most valuable prognostic points is the application of from 20 to 90 per cent cocain solution in the region of the sphenopalatine foramen. If this stops or ameliorates the pain to a great degree we can be reasonably positive that the injection of the ganglion will give good results.

I first cocainize the posterior end of the middle turbinate and the wall just behind it, with a 20 per cent solution of cocain. Then a sword needle of Sluder is employed, a straight needle 5¼ inches long with a cross bar near the end. The needle is introduced from the septal side of the nose. I transfix the posterior end of the middle turbinate and press the needle gently through the turbinate until the posterior wall is felt. The needle is then pushed upward, outward and backward through the bony wall, which is the anterior boundary of the sphenomaxillary fossa, in which the ganglion lies surrounded by connective tissue. Usually, by tactile sense, one feels the needle slip into the cavity. The ganglion is about 0.66 cm. back of the wall. A 5 c. c. Luer syringe, filled with a 2 per cent solution of phenol (carbolic acid) in alcohol, is then attached to the needle, and from 5 to 15 minims are injected. If the needle succeeds in penetrating the ganglion the patient complains of excruciating pain in the eye, ear, top and back of the head and in the shoulder, but should the phenol alcohol solution merely surround the ganglion the pain will be less severe.

The pain usually lasts anywhere from a few minutes to twenty-four or forty-eight hours, and it is in cases in which the pain is prolonged after injection that the end results to the patient are most gratifying. The number of injections necessary is variable. If the ganglion is penetrated the first time, as indicated by the severe pain, only one injection is required. If not, two, three or four attempts may be made at intervals

varying from a few days to several weeks. If no relief is obtained after four such injections I feel that further attempts would be useless. Often we find the posterior wall so thick that it is impossible to push the needle through, and in these cases I have resorted to the use of a mallet to drive it into the cavity. In using the mallet one is not so sure of being in the proper place, so I usually withdraw the needle and then reintroduce it by tactile sense, as I then have a far better knowledge of where the end of my needle is.

Emil Mayer.

The Surgical Treatment of Rhinophima.

FULD, JOSEPH E.

J. Am. M. Ass., Chicago, 1919—LXXII—734.

Under general anesthesia, an incision is made down to the cartilage in the median line of the nose and a second incision all around the growth from the midline outward. The forefinger of the left hand is now inserted into the left nostril, with the palmar surface forward, as a guide. The median edge of the tumor mass is grasped with mouse tooth forceps (assistant to hold these), and all the diseased tissue, including the entire left lower half of the nose, with the whole thickness of the skin, is dissected off with a knife, the bony and cartilaginous framework of the nose being exposed. The hemorrhage is controlled by pressure with hot pads or forceps and ligations, if necessary. The foregoing steps are repeated on the right side. It is important to leave a little skin near the opening of the nares to avoid subsequent contracture with the resulting stricture.

The final step in the operation demands considerable care, as the skin graft should be applied in one large piece if possible, and the fairly thick graft which was used in my case has contributed very largely to the striking similarity in the appearance of the new covering of the nose to that of the face in general. Short nasal tubes are now inserted into the nostril, and the nose dressed by carefully covering the graft with layers of silver foil. A gauze dressing is applied, which is held in place with adhesive plaster, and allowed to remain undisturbed for six days. As all my skin grafts were success-

ful, no further after-treatment was necessary. In cases of this sort, in which the condition so seriously affects the appearance of the patient and the results of the operation are usually both successful and gratifying, it seems surprising that an operation so simple as here described has not been resorted to more frequently.

Pollen Extracts and Bacterial Vaccines in Hay Fever (Second Report.)

FRANK, IRA, AND STROUSE, SOLOMON.

J. Am. M. Ass., Chicago, 1919—LXXII—1593.

The 1918 results are interesting and valuable. We treated only sixteen patients, and they were all treated in practically the same manner. We used this year one of the commercial pollen extracts (ragweed), started injections in July and continued to the height of the season, when autogenous vaccines were made and intensively injected.

All but two of the patients treated in this manner remained in Chicago throughout the hay fever season in considerable comfort, and all felt that the relief from suffering was remarkably good. The two patients who went away before bacterial vaccines were started suffered rather intensely from hay fever in a supposedly hay fever free section of Michigan. The results this year compared favorably with those of the 1915 season.

Specific therapy should not be undertaken in the presence of pathologic conditions in the nose or accessory sinuses. It has not been our experience that removal of polyps or similar operations has cured hay fever patients, but it has been our experience that such operations may be necessary if subsequent therapy is to be successful.

In a disease with the remarkable seasonal variations of hay fever, it would be folly to attempt to draw definite or final conclusions from the work so far reported; but from the consideration of our own and reported results, we believe it is fair to say that the method of treating hay fever patients by early prophylactic injections of pollen extract, combined with late and intensive injections of autogenous bacterial vaccines, offers the greatest therapeutic promises of any method so far

advanced in the treatment of this disease. Pollen extracts alone and bacterial vaccines alone, while giving results, do not seem to relieve so many patients as does the combined therapy. Treatment with pollen extract should start early in the season (June or July) and should be discontinued at the height of symptoms, at which time bacterial vaccines should be substituted.

We have not found that injections one year have prevented attacks the succeeding year, but we do note that in patients receiving continued treatment from year to year there is a definite tendency for the hay fever symptoms to become progressively less severe. **Emil Mayer.**

III.—PHARYNX AND MOUTH.

Recurrence of Oral Syphilitic Lesions During Treatment With Mercury.

Scott, G. O., and Pearson, G. H.

J. Am. M. Ass., Chicago, 1919—LXXII—1064.

All three are similar in that the patients had received the routine War Office treatment and were all on mercury and potassium iodid when the lesions developed. The lesions did not develop at the site of former lesions, but were of the type that McDonagh designates as autoreinfection. In two of the cases the general health of the patients was poor, but in the third case the general health was apparently good. In one case there was a mild mercurial stomatitis which later developed into a severe Vincent's infection, but all three were receiving careful dental treatment.

In these cases it seems very probable that the mercury lowered the tone of the tissues of the mouth, and spirocheta pallida, being mercury fast, was given a fertile field in which to grow.

The fact that under the present treatment such recurrences are to be encountered leads us to suggest that the routine War Office treatment be replaced by the following: During the first three weeks the patient should receive three injections of arsphenamin at weekly intervals with a total dosage of 1.2 gm. For the first eight weeks he should receive 8 grains of

mercury, given in 1 grain doses at weekly intervals, and potassium iodid. For the next four weeks he should be given a tonic. When the month of rest has expired he should receive a small dose of arsphenamin and a week later a full dose, and for eight weeks mercury and potassium iodid, followed by four weeks' rest and tonics. The purpose of the small dose of arsphenamin preceding the full one is to prevent the occurrence of a dangerous Herxheimer reaction. This treatment might be continued indefinitely, though it would probably be better to give three months' complete rest in twenty-four. The object of this method would be to heal the open lesions by the first three injections. The purpose of the continued use of mercury and potassium iodid would be to carry on the sterilization of the host. Should the spirochete, however, become mercury fast, the arsphenamin would be able to attack it while freely multiplying as the adult form. With this method of treatment, if carried on over a sufficient period of time, it should be possible to produce a complete cure of the disease with the minimum of danger to the patient and without recurrences similar to the cases cited.

Emil Mayer.

Tonsillectomy in Myostitis and Arthritis: Results in Two Hundred Consecutive Cases.

LILLIE, H. I., AND LYONS, H. R.

J. Am. M. Ass., Chicago, April 26, 1919.

The writers discuss the results of tinsillectomy, as reported in November, 1918, in two hundred consecutive cases which were operated on between July 1 and December 31, 1917. Of these patients, 87 were 30 years of age or less, and 113 were over 30, the average age being 30 years.

Of those not over 30, 81.6 per cent were better after tonsillectomy; and of the second group, who were over 30, 77.7 per cent showed improvement. Improvement was also reported in four out of ten cases of chronic disease, the patients being invalids at the time of operation. In the entire series only 57.7 per cent of the patients gave a history of tonsillitis. The authors summarize the results of their observations and the reports of the patients' condition as follows: (1) It is

justifiable to advise a tonsillectomy in every frank case of myostitis or arthritis. (2) A marked improvement may be assured from tonsillectomy alone in 79 per cent of all cases. (3) It is necessary to remove all possibility of dental sepsis; by so doing a larger percentage of patients will be improved. (4) The duration of the myostitis or arthritis is a factor in the ultimate results, although benefit and even complete cure is obtained in some long standing, chronic cases. (5) Forty per cent of the patients with chronic myostitis or arthritis who are invalids will respond favorably to tonsillectomy. (6) The size of a tonsil has no bearing on its possibility as a focus of infection. A careful expression of the tonsillar crypts and a history of throat trouble, associated or not associated with the myostitis or arthritis, is essential in the diagnosis. (7) An absence of a history of diseased tonsil in no way eliminates the organ as a focus of infection. (8) A clean tonsillectomy, with the removal of the plica tonsillaris, is necessary in every case. Emil Mayer.

Hemolytic Streptococci in the Nose and Throat, With Special Reference to Their Occurrence After Tonsillectomy.

TONGS, M. S.

J. Am. M. Ass., Chicago, 1919—LXXIII—1050.

Of 100 cultures made from the throat, sixty-seven showed the presence of hemolytic streptococci; of the nasal cultures, only five in 100 examined gave positive results. Of the 100 individuals, thirty-nine were school children sent for examination by their schools, and thirty-two, or 80 per cent of them, harbored hemolytic streptococci in their throats. Of sixty-one average individuals of this series, thirty-five, or 57 per cent, were found to be carriers. The higher percentage of carriers among school children so far examined is probably due to the tonsillar hypertrophy, as almost every school child examined had large tonsils.

The writer concludes that the tonsils, especially when hyperplastic, are a breeding place for hemolytic streptococci, and complete tonsillectomy appears to be followed in most cases by the absence of hemolytic streptococci from the throat.

Emil Mayer.

The Recognition of Tropical Sprue in the United States.

WOOD, EDWARD J.

J. Am. M. Ass., Chicago, 1919—LXXIII—165.

The tongue is inflamed and pink, with congested fungiform papillæ, eroded patches and superficial cracks on the dorsum and edges. The tongue in sprue is quite different from the tongue in pellagra. In the latter disease it will be found more pointed and not so flabby. In sprue it is very much paler than in pellagra. There is also, in sprue, an approach to the cobblestone appearance which does not occur in pellagra.

The diarrhea in sprue is the most distinctive symptom. The bowel movements occur from midnight until about 10 o'clock in the morning. There then occurs a cessation until the next day. If the cassation does not occur, there will be, at least, a marked diminution in the number of movements in the afternoon and early hours of the night. The bowel movements are very large, suggesting at once a pancreatic condition. The reaction is decidedly acid, and there is much gas mixed with the feces. Examination of the feces reveals a large amount of fat. The stools are light in color and give a positive reaction for hydrobilirubin.

The most interesting phase of the study of sprue at this time is the blood picture. In a large number of cases the color index is above 1, and a case now under observation gives a persistent index of 1.66. The anemia has always been regarded as secondary, and I have no wish to question this point; but it is important to show the condition may be confused with pernicious anemia. I believe that many cases of sprue have been called pernicious anemia. On the other hand, some cases of pernicious anemia have been diagnosed as sprue.

There was found in a recently studied case a decided preponderance of over sized cells, as well as numerous dwarf cells. There also occurs poikilocytosis. It was noted that there were many pale cells in the field when the blood was stained with any of the eosinates of methylen blue. Stipple cells were very rarely found. In the case referred to above, in which the blood was carefully studied on different occasions in many slides, no nucleated red cells were found.

Our study of sprue has led us to think that it may be a bridge between the anemias experimentally produced by the colon bacillus, and possibly others of the usual intestinal flora, and an anemia which probably owes its origin to a true intestinal disease, one which more nearly approaches pernicious anemia than any of the anemias produced experimentally. We are now preparing for a study of the colon bacillus isolated from the duodenal contents in sprue.

It is worthy of emphasis that the remissions in sprue are as striking as in pernicious anemia. That remarkable recurrence which is so often seen in pernicious anemia, even after years of quiescence, is also seen in sprue.

What the relation between the two diseases is, if any, remains to be seen, but it is not improbable that a more accurate study of sprue will shed light on many obscure corners in the study of pernicious anemia. Emil Mayer.

The Care of Children Before and After Tonsillectomy.

SMITH, CHARLES HENDEE.

New York State Journal of Medicine, May, 1919.

The child should be operated for tonsillectomy as carefully as for any operation.

After the operation he is entitled to an anodyne, and should be kept in bed for five to seven days, with careful nursing and feeding. Preparations should be made to treat hemorrhage if it occurs.

Under this plan the loss of weight is reduced to a minimum and the original weight is recovered within a few days.

Emil Mayer.

Hyperkeratosis and Tonsillar Cartilages.

LUND, R.

Acta Otolaryngologica, 1918—I—274.

While studying tonsillar mycosis Lund noted in the tonsils removed from two such cases, in addition to the familiar keratosis, numerous islets of cartilaginous tissue in the tonsils. One of the patients was a young man, 21, the other a young girl. The histologic findings are related with a wealth

of detail, and these are compared with the findings of other investigators in an effort to solve the etiology both of hyperkeratosis and of tonsillar cartilages. As to hyperkeratosis, Lund favors the view of Onodi and Entz, that the hyperkeratinization is produced by repeated or chronic mild inflammations. He also repeats the well known fact that more or less radical operations are ineffective in treatment, although the lesions may disappear spontaneously after some months or years.

As to the etiology of tonsillar cartilages, Lund compares the opinion of Ohrt (first in this field in 1893) with that of Topfer. Ohrt, who has been endorsed by many others, held that these cartilages are remnants of the first bronchial arch, while Topfer and his followers believe that they are produced by the metaplastic transformation of connective tissue. Lund seems to hold, though not very emphatically, with Ohrt, although in his own cases there appeared to be an active formative process. However, as a fellow worker pointed out, his patients were at at age when cartilage naturally proliferates in all its normal situations. A. Miller.

IV.—LARYNX, TRACHEA AND ESOPHAGUS.

Tranquil Tracheotomy by Injecting Cocain Within the Windpipe.

THOMSON, ST. CLAIR.

J. Am. M. Ass., Chicago, 1919—LXXIII—1032.

An ordinary hypodermic syringe is charged with about twenty drops of a 2.5 per cent solution of cocain. As soon as ever the tracheal rings are laid bare the syringe is grasped, as one does a pen, with the forefinger about one inch from the extremity of the needle, and with this the windpipe is sharply stabbed between two rings. The middle, the ring and the little finger of the operator's right hand are resting on the neck, and they prevent the point from penetrating more than one-fourth to one-half inch within the lumen of the trachea. The cocain solution is injected into the cavity of the windpipe, from five to fifteen drops, and the needle is sharply withdrawn.

The liquid in the windpipe at once gives rise to a slight, stuffy cough. It causes no spasm or distress, and as it trickles down toward the region which endoscopists know to be the

sensitive spot of this area, namely, the carina at the bifurcation of the trachea, this tickling cough soon ceases. If there is no great urgency, ten minutes should be allowed to elapse, the time being occupied by clearing the front of the trachea, checking all bleeding, preparing the tube and so forth. At the end of that time the incision can be made into the trachea and the canula introduced, without pain, spasm or even the slightest cough, as quietly and smoothly as the original incision through the skin. The calm with which this proceeding takes place is in striking contrast with the agitated, hurried and often bloody and dangerous operation of former days.

I have used cocain of the strength of 2.5 per cent for the simple reason that a 5 per cent solution is usually at hand, and it has been convenient to dilute it one-half. In children, a 1 per cent solution and five drops would be sufficient.

The method is employed with either general or local anesthesia. Emil Mayer.

V.—MISCELLANEOUS.

Effects of Chlorin on Isolated Bronchi and Pulmonary Vessels.

BARBOUR, H. G., AND WILLIAMS, H. W.

J. Am. M. Ass., Chicago, 1919—LXXIII—1089. From Pharmacol. and Exper. Therap., Baltimore, 1919—XIV—No. 1.

The presence of even small concentrations of chlorin Barbour and Williams state leads to a slight relaxation of pulmonary vessels. When a concentration approximating 250 mg. of chlorin to 1 liter of Locke's solution is attained the same response occurs, but is soon succeeded by a slow and prolonged contraction of the muscle. High concentrations, 620 per liter, produce no relaxation but a rapid and extensive contraction. These vascular rings will, however, relax again if the solution be replaced by one which is chlorin free. The bronchial musculature yields similar responses to chlorin but the relaxation occurs with less constancy. It was marked, however, in one case where the concentration was high as 680 mg., being succeeded by the usual constriction produced by such amounts. Another difference between vessels and bron-

chi lies in the fact that for the latter the minimal constricting concentration is much lower than for the former, less than 200 mg. per liter sufficing to contract the bronchial rings.

Emil Mayer.

Should Hypnotism Be Used to Correct Stammering?

TOMPKINS, ERNEST.

Med. Rec., N. Y., 1919—XCV—731.

From what has been stated it is evident that there can be no difference as to the relief afforded by hypnotism, for such relief is unquestionably supported by both observation and reason. The only difference is to the extent, rather the permanence, of that relief; and the overwhelming opinion is that, even if some light cases do recover ultimately under the treatment, the benefit to the speech does not offset the undesirability of long submission to the will of the stammerer to the suggestion of another person.

The duration of the temporary disappearance is indefinite. In the cases of recurrence first cited by Dr. Godfrey the disappearance must have extended for years, probably from early youth to the time that the shock of battle revived the impediment. What better evidence is needed of the persistnce of the speech doubt, or of the inadvisability of announcing stammering cures? Yet we frequently hear of the instantaneous cure, the "he-never-stammered-again" kind, and the three week cure is almost indellibly stamped in the popular mind by advertising as mendacious as it is persistent.

It will probably be sufficient to consider two subjects in conclusion, namely, an academic one and a practical one. The academic one is the classification of the disorder. Dr. Godfrey rejects neurosis and considers psychosis surely established. In order to avoid any suspicion of bias or dogmatism let us state the conditions and then let whoever wishes to do so, draw his conclusions from the conditions. The origin of the disorder is accidental or incidental interference with newly acquired automatic speech. (If the inducing cause is severe, even well established speech may be upset, as by the shock of battle.) The continuing cause is the fear of ridicule prompted by the interference. Notice that the interference

is purely voluntary, and that the fear, being the result of experience, is perfectly logical. Now will someone or anyone make out of that a neurosis, psychosis, or any recognized disease?

The practical subject is to get rid of the disorder. Since the inducing cause increases in intensity with every convulsive effort, it should be evident that those efforts should be prohibited as soon as they appear—that is, in childhood (excepting war-shock). At that stage of the disorder no further treatment is needed because the fluent spells which naturally occur will supply sufficient normal speech to dissipate the fear of disability. As long as society rejects this tame and unremunerative remedy in its persistent search for the mythical cure, just so long will thus cruel affliction continue; for, although those stammerers who are fortunately situated may recover by the exercise of determination and persistence, the great majority of confirmed stammerers have no chance of recovery under our present organization of society in which the stammerer is forced to talk in order to make a living.

Emil Mayer.

Bacterial Carriers in the Upper Respiratory Tract.

SIMMONS, JAMES S., AND TAYLOR, ROY E.

J. Am. M. Ass., Chicago—1919—LXXII—1885.

Over half (56 per cent) of 3,174 persons examined at the Walter Reed General Hospital between January 22 and May 1, 1919, were carriers of streptococcus hemolyticus.

After tonsillectomy in sixty-six cases, only 23 per cent of cultures showed hemolyticus streptococci, and in all of these the number of colonies was small.

A comparison of the weekly percentage of carriers with the weekly occurrence of infection failed to show that any direct relation existed between the two. January 29, 1919, the streptococcus pneumonia curve reached its highest point, while the carrier percentage was at its lowest; and as the latter continued to rise, the former fell to the zero line.

For other organisms, the total positive percentages were: Pneumococci, 25 per cent; meningococci, 2.99 per cent, and Klebs-Loeffler bacilli, 1.4 per cent.

SOCIETY PROCEEDINGS.

NEW YORK OTOLOGICAL SOCIETY.

Meeting of March 25, 1919.

DR. THOMAS J. HARRIS, PRESIDENT.

DR. T. P. BERENS gave the details of a case of

Septic Sinus Phlebitis Without Discoverable Clot.

DISCUSSION.

COLONEL EAGLETON: I would like to ask how you made your diagnosis of the phlebitis?

DR. P. D. KERRISON: I operated in a case about a year ago, in which there were features bearing on the present discussion. The patient was the son of a physician and was operated upon in St. Luke's Hospital. Shortly after the operation (a mastoidectomy left) symptoms indicating septic absorption developed, and many consultants, including Dr. Samuel Lambert, Dr. Duel, and Dr. Richards, were called in. The patient developed pneumonia, and there was naturally considerable difference of opinion as to the rôle of the ear in causing any of the symptoms. Frequent blood cultures were made, however, and finally a definite report of streptococci in the blood was obtained. He was therefore subjected to a sinus jugular operation. There was no demonstrable clot in either sinus or vein. The usual resection of the jugular was done, the resected portion being sent to the hospital laboratory. Two or three days later, report came from the laboratory that streptococci had been found in the walls of the vein, which in part was also denuded of its intima. It is clear that in this had the resection of the vein been omitted, the periodic septic absorption would not have been ended. Two days after the operation, another specimen of venous blood examined showed complete absence of pathogenic germs. Dr. Kerrison said that in his opinion, whenever the sinus was opened on account of a supposed intrasinus infection the jugular should be tied or resected as a routine matter.

THE CHAIRMAN: Was the vein examined, Dr. Berens, in your case?

DR. BERENS: I am under the impression that the specimens were lost with the dressings. Dr. Friesner also saw the case.

DR. FRIESNER: I had rather a curious experience a little over a week ago, that fits rather well with these cases that have been detailed. I saw, with another otologist, a baby of about two and a half or three years old, that had been operated upon, a simple mastoid having been done about three weeks before. The child ran a practically normal temperature, after a post-operative rise for twenty-four hours, up to three days before I saw the child; then the child had a rise to 103 and a drop, with a sweat; the following day another rise to over 104, and the day that I saw it the temperature was 106. The child looked very decidedly ill and septic—pale—and in looking at the wound, it seemed to be covered with perfectly normal granulations, except over an area of sinus that was exposed, which looked dirty green. The blood culture was negative, but the blood count—I forget just exactly the details—was very suggestive. Two blood counts had been made, and I think both of them showed total leucocytes over 15,000, with a fairly high poly count. It was decided to explore the sinus. The sinus was uncovered, first back toward the torcular, and when we got just a little way beyond the knee, it looked good. It was then uncovered in the entire mastoid wound, coming down or internal to the cerebellar dura, and as we got down toward the bulb the sinus again looked very good, like a normal sinus wall. The sinus was blocked over at the bulbar end and at the torcular end, and opened. The wall was thick. There was no clot. The otologist determined not to tie the jugular, not to go into the neck at all. The child again had a postoperative rise to 105—that was just a week ago today—and since then the temperature has been normal.

I read a while ago a report by McKinney of Memphis, of a case of supposed sinus thrombosis, in which the sinus was merely uncovered, and then because the child was in such bad shape nothing further was done, and the child made an uninterrupted recovery.

In this case of which I spoke the sinus was opened fairly well, but no attempt was made to touch the vein.

THE PRESIDENT: Dr. Friesner opens up a very important question, and what Dr. Kerrison has referred to also, namely, whether we should feel that the absence of a clot in a sinus thrombosis is the ground for regrets that the vein was opened.

If you will permit the Chair to speak on this, I believe that we should be very cautious about drawing such conclusions. Was it not Dr. Whiting who made the dictum—certainly it has been made repeatedly—that in all these cases the vein will show bacteria when it is examined.

I have seen in the past year at Oglethorpe at least five cases of sinus thrombosis; in three of those cases there was no thrombus at all that we could discover. In all those cases, however, the vein was tied off preliminary to opening the sinus. We operated because of the general condition of the patient after the mastoid operation, the way the temperature ran, and the fact that the patient was septic, and his positive blood findings. Personally, I never had any other feeling that there was anything else except a disease of the vein there, and would not at all accept the position that we did anything but the right thing.

I read that report by Dr. McKinney. I am something like the man who said he didn't do a mastoid operation and the patient got well. Personally, I would have felt very unsafe not to have operated on the case.

DR. FRIESNER: I do think that the name sinus thrombosis is very often a misnomer and that the cases should be called phlebitis—the thrombus is merely an incident, after all.

DR. BERENS: That is the terminology we will have to adopt, for it is, I think, a septic phlebitis. The clot is a secondary condition.

COLONEL EAGLETON: I think we should revise our conception of our sinus thrombosis. I believe it is pretty well conceded now among the experimenters that we always have a phlebitis and that the formation of the clot itself, instead of being, as we regarded it for many years, causative, is nature's effort to cure the lesion with a phlebitis; that there is built up a clot inside of an inflamed sinus. The inflamed sinus attracts to itself leucocytes and red blood cells, and it is the formation of the clot that is nature's protective effort, and in a great majority of cases it does protect it. However, if

the process is virulent enough, the clot itself then becomes infected, and those are the cases in which when we open we find an infected clot; but the process was primarily in the sinus wall with the secondary formation of a clot, which has been at first protective, but then ultimately the clot, becoming infected, continues a source of infection.

I was amazed some time ago to hear an otologist say that he had never seen a mural clot. I think they are very common; if we operate upon our cases very early and if we cut through the sinus wall with the same delicacy as in a cataract extraction, we will frequently see a mural clot. If, however, the sinus is opened deeply and fully at one stroke of the knife, there is a great rush of blood and the small clot is not seen; but in the early cases of sinus thrombosis, if the sinus is freely uncovered, and then with a sharp knife an incision is made slowly and carefully into it, it is surprising the number of cases we will find the mural clot, and having removed or incised the mural clot, there will be a rushing of blood.

DR. BERENS: There was a large vein entering into the knee of the sinus. I had never seen one in that location of that size.

DR. PAGE: I have recently had two cases of phlebitis of this kind: one in a double mastoid, in a baby not quite two years old, that had influenza, and double otitis following influenza. It was watched by the baby's doctor for two weeks before I saw it, with a temperature at times as high as 106, and coming down to 101, for nearly ten days—not going to 106 every day, but between 104 and 106. I operated on it, did a double mastoid and exposed both sinuses and was rather surprised to find the mastoid not broken down; there was pus through the mastoid, but it was not very soft. But the vertical limb of both sinuses, particularly the left—which was not the ear we thought the condition would be so far advanced in—had a dirty grayish appearance, though no thickening of the wall could be seen or felt. It looked as though infection were passing through the vein wall. I did not open the vein and the temperature came down gradually very satisfactorily after three days; it did not fall suddenly as it sometimes does, but came down gradually. About the eighth day, I think, after the operation, there was no attempt at repair on the veins on either side (less on the worse looking vein), and the gauze drainage

had been removed, which allowed the soft parts to lay against this vein for twenty-four hours, and during this time her temperature went up to 105 again. Blood cultures taken at the time of operation were negative. When the soft parts were separated from the vein wall and the wound wiped out with 5 per cent dichloramin-T the temperature came down, though some time elapsed before the vein wall grew healthy and red.

The same thing occurred in a boy, eight years of age, that been sent home from the hospital on the tenth day after his mastoid operation with an exposure of the sinus which still showed no attempt at repair over its wall. Granulations seemed to be slow in growing over it. He suddenly ran a temperature of 105, so was sent back to the hospital. He had a leucocyte count of 20,000. the first day and the second day his temperature came down, after the vein was rubbed with dichloramin-T; yet his leucocytes went up to 30,000 after his temperature had come down, but they gradually came down to 14,000 and then to 11,000.

DR. S. B. LUTZ: Toward the end of January I did a mastoid operation upon a big longshoreman who had an immense mastoid and I found that the necrotic bone went down to the sinus. I uncovered a large portion of the sinus and opened the sinus, got a small clot and a very free flow of blood from above and below. That night he had a chill. It would have been a typical sinus case if the sinus had not been opened. In about four days he developed trouble in his left calf, and several days afterward a large quantity of pus was evacuated. He insisted upon going home. After he was home, his thigh was opened and I got a large qauntity of pus from his thigh. Later on he developed an abscess at the base of his spine and another one in his right wrist.

DR. BERENS: Had you tied off the vein?

DR. LUTZ: No.

DR. BERENS: I think it is good surgery to tie off the vein, and personally I think it is inexcusable not to do so—I have come to that conclusion. I have always held that view, that the vein should be tied off, if possible, before the lateral sinus is opened; even though the lateral sinus be exposed and a clot found, I think that the vein should be tied in the neck before the sinus is opened, if you possibly can do so.

DR. LUTZ: As we have in years past opened the sinus without ligation of the vein, I thought I would try it again But it hardly seems possible to me that the condition was due to opening his sinus, because I believe that he would have developed this phlebitis in his leg just the same, because it happened within four hours.

DR. BERENS: But if you had tied off the vein, you would never have had the slightest doubt about your own surgical procedure. Now you have.

DR. PAGE: May I ask Dr. Berens if before he ligates the vein, he blocks off the sinus with plugs?

DR. BERENS: It depends on the case. Let us take the case of out and out clot.

DR. PAGE: I do not mean opening the sinus, but I mean blocking off the torcular end of the sinus first, before going into the neck; blocking off that first, then ligating the vein, and then opening the sinus.

DR. BERENS: In this last case we did—we ligated the vein first in the neck, then blocked off the torcular.

DR. KERRISON: Some years ago I tried to obtain the views and experience of various men on the question under discussion. I found that there was a great deal of difference of opinion as to which should be the preliminary step—i. e., the opening of the sinus or the resection or tying of the jugular. But I could obtain no evidence that the average results were influenced by the sequence adopted. My own opinion, based on my own experience and an analysis of that of others, is that it does not make a particle of difference which is done first. Dr. Berens believes that the jugular should be resected first to obviate the danger of dislodging a clot into the general circulation. Well, if the jugular is bisected first, you have to think of the possibility of a reverse current carrying septic matter in the torcular direction, an incomparably more serious matter.

DR. BERENS: I think that the blood stream from the torcular is down into the jugular and down on into the heart, is it not?

DR. KERRISON: Yes.

DR. BERENS: Now, if you tie off your jugular first and then if you manipulate, you are allowing bits of clot to get down into the heart. In other words, if you have established your

diagnosis of lateral sinus septic thrombosis, tie off below the thrombosis before you open up, because when you open up you are manipulating a clot, and you are liable to fracture a bit of it off and it is likely to get into the jugular vein.

DR. FRIESNER: But the point to be made is this: that when the jugular is tied on one side, you are apt, through suction on the other side, to aspirate the plug. I never saw the sinus collapse, as it should during inspiration if suction occurs around that way. If there were any way of working that out experimentally, I think it would be a very good thing to do.

COLONEL EAGLETON: Mr. President, in relation to the sinus, an experiment was carried on with a grain of millet, which was inserted in one sinus, and it was recovered from the opposite sinus after closure of the sinus. That experiment by a physiologist demonstrated to my mind that infection may enter the circular from the end of this infected sinus towards the trochlear, although the clot, being protected, usually prevents this.

DR. GORHAM BACON: May I say one word in regard to very young children? I feel as if it is a very serious thing to tie off a vein in such cases unless it is absolutely necessary, and I have operated on a good many children and have not found it necessary to do more than simply open the sinus and remove the clot in many cases.

It seems to me that in a very young child we ought not to lay down the rule that we must tie off the vein in all cases; and as far as tying the vein in adults is concerned, I still adhere, for the most part, to the old method of opening up the sinus first and then tying off the vein afterwards if I think it is necessary. Of course, we certainly have a good many cases where we are in doubt as to whether there is a clot in the sinus or not.

I remember one case that presented all the symptoms of sinus thrombosis, and yet when I opened up the sinus there was a copious flow of blood from each end, and I did not go on any further with the operation. The patient made a good recovery. I do not know what the patient had, but I opened up the dura for a brain abscess and explored it generally. The patient recovered, and I do not know now whether it was a case of meningitis or what it was—there was a considerable

loss of blood. I always felt that it was a case of meningitis, and possibly the free blood aborted the disease.

We do see a number of cases where we do not find a clot, and it does not seem to me we ought to go on under these circumstances. I am ready to go on if the patient presents further symptoms of thrombosis.

DR. LUTZ: I made it a rule to tie the jugular whenever I opened the sinus, until a couple of years ago, when I had four cases, one right after the other, that were in bad shape, and apparently did not warrant the further operation. They all did well; and that was one reason why I did not do anything with this man that I speak of. He was in very poor condition and because he had a very free flow of blood from below and above, and the little bit of clot that was extruded seemed to be practically all that he had, and I thought we would see what we could do with him. Up until about two years ago I had believed that it was necessary to tie the vein. A number of years ago we did not tie a vein very frequently and we opened a large number of sinuses, and they apparently did well. Later I did exactly the same as has been advocated tonight, thinking it was the safer proposition, but in this case that I spoke of, it proved that it was not. Still at the same time I have no question in my own mind that this man would have had his phlebitis just the same.

DR. KERRISON: It does not seem to me that Dr. Lutz's case disproves the necessity for the jugular resection, because his patient had three metastatic abscesses.

DR. BERENS: I just want to picture the extremes of two conditions: One illustrated by this patient that I reported tonight, and the other one an out and out clot, where the lateral sinus is uncovered at or near the knee. Somewhere in the sinus a distinct clot is found and you go on and uncover, and on either side you find a perfectly healthy blue vein. In other words, the sinus walls are unaffected beyond the clot. There is a lateral sinus thrombosis, with a localized phlebitis.

There is another type, and that is a phlebitis without a demonstrable clot. I remember a good many years ago reporting before this society a case of lateral sinus thrombosis, with phlebitis, and the phlebitis (not thrombosis) extended down far below the clavicle and the case went on; it died. We got

a postmortem, at least we made a postmortem of the wound, and we found that the phlebitis had extended down into the vena cava. The white striations could be sen all the way down it. A portion of the vena cava was examined and found infected.

Now, there are the two different conditions, one a descending, or rather, a stretching out phelibitis, inflammation and infection of the walls of the vein, and in the other a clot with normal vein on either side. Now, in the phlebitis case, if the circulation and the continuing of your vein are not cut off, the infection is going on along that vein and will go down into the chest—and it can go either way. That has been my experience, based on only two or three cases, but it is so real that I cannot help bringing it out as a warning tonight. I want to accentuate the difference between a descending, or at least a fulminating phlebitis, disease of the vein extending downward, and a thrombosis.

Encephalitis Lethargica.

COLONEL EAGLETON: The newspapers have been filled with accounts of the socalled "sleeping sickness." I think the cases are very common. I am quite sure that they are going to come to our offices, as otologists.

It was my good fortune to see a postmortem in the City Hospital of encephalitis lethargica, as it is now called, and following that I saw two typical cases, both of which were diagnosed as abscess of the brain; that is why I was sent for. The second one had nothing the matter with his ear, and I could not see anything the matter with his nose, and I said if it could be demonstrated that he had anything wrong with his nasal accessory sinus I would be perfectly willing to explore his frontal lobe. X-ray findings were negative. In the meantime there appeared in my office four cases, two of these cases having had marked ear symptoms, and of all the four cases vertigo was a very prominent symptom. Still, if you will look at the literature on this subject, very little attention is paid to it; all have ocular paralysis; they are not profoundly sick; one of them has had a facial paralysis, but they were all "dizzy." I went over their ears very carefully and every one of them has a demonstrable disturbance of the vestibular re-

action. Of course, in these four cases they are all cases that are the end results. One of the cases had a nystagmus, had a perfectly normal bone conduction, normal aural conduction. He had a nystagmus of eighteen seconds in one direction and a nystagmus of forty-two seconds in the other direction.

One of the other cases had a nystagmus of twenty-five seconds in one direction and forty-five seconds in the other. One of the cases had a marked nystagmus. That was one of the chief things he had at the time of his attack. He came to my office because had double vision, and when he went through his history it was apparent that he had had a mild attack. It came on with vertigo, a paralysis of one of the ocular muscles, and he said the most annoying symptom with him was the terrible noise in his head, and yet his ear was normal.

The point I want to make is that in looking over the literature the frequency of the seventh and eighth being involved is not emphasized, although they speak of the third, fourth and sixth frequently being involved.

THE CHAIRMAN: We understand, do we, that you diagnosed these cases as encephalitis?

DR. EAGLETON: Lethargica.

Case 1.—This man came in recently with a history as follows: He came to my office on March 8th; recently had grip, and not entirely recovered; feels weak; sees double since Thursday. Keeping the upper left lid lowered enables him to see straight. Has had much headache and some dizziness of late. Previous to this condition had good vision and sight seemed normal. Double vision passed in two days. From that he had a typical third involvement. I said to the patient, "You have a mild attack of 'sleeping sickness,' as it is called. Now, don't get frightened; you're all right; just go home and keep quiet." He went home a few days afterward the doctor called me up and said, "this boy is dopey." We took him to one of the hospitals and he was very dopey. We have done four lumbar punctures on him. Examination showed normal fluid increased in amount without any microbes.

THE CHAIRMAN: You have heard the report that Colonel Eagleton has made of this very remarkable disease. Have any of the members of the society had any experience with it? It is very new. How many cases are there, Colonel Eagle-

ton? Have the cases now gotten beyond the matter of numbering them in this country?

COLONEL EAGLETON: There are a tremendous number. The two points I would make are: That they are ambulatory cases; they are going to our offices with the symptoms of vertigo; all these cases have gone to the oculist, and they are going to the oculist for two things: Vertigo and double vision. However, if you test them, you find there they have vestibular apparatus disturbances.

DR. MCCULLAGH: Why do you call that case an encephalitic letharigica—why could it not be a toxic paralysis following the influenza?

DR. FRIESNER: Why isn't it a tubercular meningitis?

COLONEL EAGLETON: That is why they don't die. The pathologic findings of cases which should die is a peryvasculitis. However, in this country all the cases have followed grip, and whether it is a secondary infection following Pfeifer infection, of course is not known, but in England, where a large number of cases have been seen, the report of the commission is that it is a distinct infective germ—that is, a specific germ, but in this country all the cases that have occurred have followed grip.

DR. FRIESNER: Do they have fever, are there any signs of meningeal irritation? Do they have a rigid neck?

COLONEL EAGLETON: They often have a rigid neck. They also vomit. In the second case I saw, they said he had an abscess of the brain and a rather accelerated pulse.

DR. FRIESNER: How high does the temperature go?

COLONEL EAGLETON: About 102. As to the findings in the spinal fluid, the fluid is increased in amount. It has an excess of the cell count, chiefly mononuclears, which is different from what we find in other infections. For instance, last night I saw a case which is undoubtedly an aseptic meningitis from an ear, for while there were no germs in the encephalitic letharigica, this case was a suppurating ear case because the findings of the cerebrospinal fluid showed that the cells were almost all polymorphonuclear.

DR. MCCULLAGH: Do they have any pain?

COLONEL EAGLETON: They have very violent headaches.

DR. MCCULLAGH: I have a case that I went to see tonight.

This may throw some light on it. It was the case of a man of about twenty-four or twenty-five years of age. I did an adenoid and tonsil operation on him about ten days ago. He got an acute ear nine days after the operation, on the left side. I opened his drum Sunday morning, and he came down to my office Monday morning. His temperature was 103° and he was complaining of a great deal of pain on the top of his head, and naturally I sent him home to bed. His ear condition is doing very nicely, it is draining well, there is no tenderness, and no pain in the ear, but he complains of this terrific pain on the top of his head, which he claims starts in the frontal region. His family says that sometimes he actually yells with the pain. He has no mastoid symptoms whatever, he has no stiffness in the back of the neck, but he has a slow pulse. When I saw him at about seven o'clock this evening he had a temperature of about 100 and a pulse of 60. He has vertigo but no nystagmus. The pupils seem contracted, but they respond both to light and accommodation.

THE CHAIRMAN: You have not had his fluid drawn?

DR. MCCULLAGH: No.

DR. KERRISON: Have you any kind of a blood count?

DR. MCCULLAGH: I ordered a blood culture and count tonight. This vertical pain which he says is very severe came on a few hours after the acute ear condition.

DR. KERRISON: What are the peculiar symptoms there—just the head?

DR. MCCULLAGH: He has some vertigo when he gets up, temperature, and a slow pulse, comparatively speaking. He has been abroad and has been severely gassed, and he had had the irritable heart following gas.

DR. KERRISON: How about the temperature?

DR. MCCULLAGH: The highest that it has been today is 102 1/5°—that was about noontime. It is down to 100° tonight. Yesterday the highest it got was 103°.

DR. FRIESNER: Is the headache constant or does it occur just with the temperature?

DR. MCCULLAGH: On Sunday when I saw him he complained of this soreness on the top of the head, and he said this afternoon that it has been more or less constant. I mean to say that there is a constant pain there, but there are also these

very acute exacerbations in which I have not seen him yet.

I would like to ask Dr. Eagleton if he thinks that in any way corresponds to his case.

COLONEL EAGLETON: This man has a suppurating ear. These other cases do not have suppurating ears. The one that I had last night was an ear case. His ear suppuration has stopped, but by his spinal fluid we decided that it was not an encephalitis letharigica.

Could I just read one of the cases?

"History.—School teacher; has been subject to headaches all her life in all parts of the head; would begin in the occipital region and radiate over the front, either side; associated with tenderness of the mastoid. Had grip in December. Following grip, about three weeks after, had a drooping of both upper lids, with a numb sensation in her right arm, associated with a buzzing in both ears, especially the right ear. Tender spots all over the scalp. Thought to be developing a mastoiditis, because of the tenderness over the mastoid. Two weeks later ptosis of both eyes, gradually disappeared, followed by diplopia. Paralysis of the internal rectus of the right. Dizziness. Rotation to the right; horizontal nystagmus, 25 seconds. Rotation to the left, horizontal nystagmus, 45 seconds."

DR. KERRISON: Have you read and seen enough about these cases to say anything about it authoritatively—that is, about the prognosis?

COLONEL EAGLETON: The prognosis is good—of those that become truly lethargic perhaps 30 per cent die.

DR. FRIESNER: Could not the abnormality be accounted for by the paralysis?

COLONEL EAGLETON: Yes, it can. However, if you cover the affected eye, you have a difference in the nystagmus. They all have had dizziness, that is not correctible by the covering of one eye, which is generally the case if you have an ocular vertigo. In only one article that I have seen is the frequency of the involvement of the seventh, eighth and twelfth mentioned, while they all speak of the involvement of the third, fourth and fifth.

DR. FRIESNER: Have you seen any hypoglossal paralysis?

COLONEL EAGLETON: I have not.

DR. BOWERS: I might mention two jugular cases I have

Negative Blood Culture in Sinus Thrombosis.

seen in the last six weeks which are very interesting. The first was a woman of about twenty-five years who was admitted to St. Luke's February 10, 1919, with a history that three months previously she had influenza, following which the left ear felt stopped up. Two months previously the ear began to discharge; one month previously the patient began to have severe pain in the head. On examination there was a profuse discharge from the left ear with considerable mastoid tenderness, otherwies patient was apparently normal. Her temperature was 106.2°. Mastoid operation was performed and the mastoid found to be filled with granulation and pus. Sinus was exposed throughout mastoid portion. Wall of sinus thickened, slightly grayish and collapsible. Patient did well for eleven days following operation, temperature gradually becoming normal. On the eleventh day she had a slight rise of temperature. On the following day she had a rise to 104° and then down to normal. Blood culture was negative. She had a papilloedema on the left side. I resected the jugular vein and found the upper part of it solid with clot. Opened the sinus and found it filled with pus and clot. Sinus wall was necrotic. Two days later a blood culture was negative. The interesting part about this case is that previous to the jugular operation there had been three blood cultures taken, all of which were negative, and yet there was free pus and a broken down clot in the lateral sinus. Patient made an uneventful recovery.

The other case was that of a child, about seven years old, who was admitted to St. Luke's Hospital March 6, 1919, with the history of having had pain in the left ear for one week. Ear opened two days previously, since then considerable amount of discharge and pain. Simple mastoid operation was performed on the following day. At this time a perisinus abscess was found with the pus under pressure. The sinus did not look normal in the lower part near the bulb.

A blood culture was taken. On admission, the patient's temperature was 102°; on day of operation it was 104 2/5°. The following day the blood culture was reported as positive for streptococcus hemolyticus. On that day the jugular vein

was resected from as high up as possible to the lower third of the vein. The upper past of vein was found to be solid with clot. The lateral sinus was then opened and found to be filled with clot. The clot was removed as far down as possible. Posteriorly the clot extended for a distance of one and one-half inches back of the knee. This was removed and free bleeding was obtained. Patient's temperature following the operation for the first three days ranged between 101 and 104 degrees. Blood count: white blood cells, 13,000; polynuclears, 90; lymphocytes, 10; spinal fluid, 5 cells; 1 polynuclear, 4 lymphocytes, butyric negative. Seven days later the temperature ranged between 98 and 105 degrees and then came down to normal. Six days after operation the blood culture was negative and he began to complain of pain in his right lower chest. He had some dullness in the ninth and tenth spaces posteriorly. Exploration was made but nothing found. At this time, four weeks after primary operation, his temperature was normal and his wounds were practically healed.

THE CHAIRMAN: Was there a marked leucocytosis in these cases?

DR. BOWERS: The first case had a leucocyte count of 20,000 and a differential of 92 polynuclears. The other one had 22,000 and a differential of 86.

THE CHAIRMAN: The Chair saw a case this last year with a very distinct leucopenia, which in my recollection was a negative blood, and there the operation demonstrated a very distinct sinus thrombosis.

DR. BOWERS: There was no question about that sinus being full of pus.

DR. BOWERS: What was the condition of the sinus above and below?

DR. BOWERS: The sinus posteriorly was normal. The rest of the sinus was filled with clot and pus, and the sinus wall was necrotic as far down to the bulb as I could go. I curretted out below as much of the contents of the sinus as I could reach and obtained moderate bleeding.

DR. BERENS: Was the vein white above?

DR. BOWERS: Yes, it was white.

COLONEL EAGLETON: Let me ask why you currette the clot?

DR. BOWERS: My only object is to get rid of the clot and of as much infection as possible.

COLONEL EAGLETON: In the sinus itself?

DR. BOWERS: Yes, the wall itself was necrotic.

DR. BACON: Mr. President, it seems to me that this question of negative blood count emphasizes the fact that, after all, the clinical symptoms are the important ones, and that the laboratory helps us at times.

THE CHAIRMAN: I am glad to hear Dr. Bacon make this point that Dr. Gruening used to make so many times in this meeting of the society.

DR. PAGE: It is true of a negative Wassermann and of other negative findings.

Radical Mastoid Operation.

DR. BOWERS: I might mention two interesting cases of radical mastoid operation. One was a man about thirty-five years of age, who was admitted to Bellevue Hospital in February, 1919. He gave a history of having had a discharge from his left ear for twenty years. His fundus was very narrow, with a large perforation into the attic, from which a pulsating mucopurulent discharge was coming. After exposing the mastoid cortex two cortical perforations were found, from which cholesteatoma was protruding. Upon removing the cortex the entire mastoid bone was found to be filled with cholesteatomatous material. Every particle of the bone was gone, over the floor of the middle fossa, the sinus and the cerebellar dura internal to the sinus; considerable bone was gone posterior to the sinus. The facial nerve was exposed throughout its entire vertical portion on the posterior and external aspects. A probe could be passed beneath the descending portion of the facial nerve from the middle ear to the mastoid cavity. The bone over the anterior portion of the facial nerve was necrotic and had to be removed. There was a lot of destruction around the semicircular canals, and the horizontal semicircular had a fistula in it. Even the bone in the angle between the middle fossa and posterior fossa was gone. I lowered the floor of the meatus, removed all necrotic bone in other parts of the cavity, cut a large meatus and closed the posterior wound. Outside of a slight weakness of the

muscles of the corner of the mouth lasting for about two weeks, the patient escaped without any bad results and has since made an uneventful recovery.

Necrosis of the Carotid Artery.

Another case was one admitted to Bellevue Hospital in January, 1919, with a very similar history, but with most of the destruction in the floor of the middle ear. In this case a probe passed downward in the floor of the middle ear met with no obstruction. The floor was filled with granulations which I made no attempt to remove and did as little probing as was possible. I cleaned up the mastoid portion, took down the bridge, lowered the facial ridge and reformed the bony portion of the meatus, cut a large meatus and packed the wound wide open, the idea being later to do a secondary operation on the floor of the middle ear. Next day the house surgeon called me up and said the man was bleeding from his pharynx and it was discovered that the bleeding was coming from the neighborhood of the eustachian tube. The bleeding, however, stopped. The following day, about the same hour, he started to bleed again from his pharynx. This also stopped in a short while. The house surgeon on that day had done nothing more than put more packing on top of the packing which was already in the wound, and there was very little staining from the wound. About fourteen hours later he started to bleed again from his pharynx, this time more profusely. The house surgeon was called and he told the man to rinse his mouth with ice water, which he did, and instantly there was a tremendous flood of blood from his mouth and nose, which was completely overwhelming and the man died within a moment. This blood was arterial blood. After death the house surgeon put his finger into the nasopharynx in the neighborhood of the tube, and found that the tissues there were all necrotic and his finger met no resistance. This undoubtedly was a case of necrosis of the carotid artery.

THE CHAIRMAN: I have never heard of anything quite so extensive in lack of bone.

DR. BOWERS: I never have seen any as extensive as that.

DR. PAGE: That was an arterial hemorrhage—it could not have been from the bulb?

DR. BOWERS: It just overwhelmed everybody around there—he died in a very few minutes.

DR. EAGLETON: No amount of packing could stop it?

DR. BOWERS: No, there was nothing to pack against; there was nothing solid there, everything soft and necrotic.

DR. PAGE: Did not Dr. Whiting, Mr. President, have a case of injury to the internal carotid in a radical operation?

THE CHAIRMAN: Yes, that is the only case I know of.

COLONEL EAGLETON: I saw an operator who was trying to remove the labyrinth and tore into the carotid.

DR. PAGE: I saw Dr. Dench once in taking off the floor of the canal to expose the hypotympanic space enter the bulb. He got pretty free bleeding, but controlled it with a very small piece of iodoform gauze, and controlled it so well, with such a small piece of packing, that he went ahead and skin grafted the rest of the cavity.

Epithelioma of the Tonsil.

DR. BACON: I had a case that interested me very much the other day at the clinic. I have not seen any case like this before. This man came in with a very suspicious looking growth on the right tonsil. He was a man of about fifty years. I took a slice off the growth and had it examined. We had a Wassermann done, etc. The growth proved to be an epithelioma of the tonsil. The glands of the neck were enlarged. I was going to send it to some surgeon to see if he thinks an operation advisable.

DR. KERRISON reported two cases.

Mastoid Abscess Without Aural Discharge.

1. The first case was that of a baby of four months, which he saw in consultation with Dr. Howard Gillespie Myers. In this case the first symptom noticed was the appearance of a swelling behind the right ear. The auricle was displaced downward and forward in the way characteristic of a post-auricular subperiosteal abscess. There had been no premonitory symptoms. The baby had not appeared fretful, had slept well and taken its bottles as usual. There had been no aural discharge. The drum membrane was intact but somewhat infiltrated and reddened. Careful questioning elicited the

fact that one month previously the baby had been peevish for a day, suffering from what was considered a slight gastric upset, from which it quickly seemed to recover. A mastoid operation showed a cortical perforation and a mastoid process the cells of which were full of pus. The baby made a quick recovery—i. e., in three weeks. The case is recorded as illustrating the extent to which a suppurative aural lesion may go without symptoms sufficiently pronounced to attract attention. The parents are people of means, and the baby was constantly under careful care and observation.

Mastoid Operation Complicated by Bleeding.

2. The second case was that of an old man, age sixty-eight years, who was operated on for mastoiditis, left, on March 14th. There was some history of troublesome nose bleed often requiring tight packing. Nothing else to suggest hemophilia. The night following the operation I was called to the hospital on account of bleeding which the house surgeon could not control. When I arrived he had lost half a pint to a pint of blood. Removal of the packing and tight repacking with iodoform gauze controlled the hemorrhage. For several days he had no recurrence, though at each visit the dressings were found stained by more than the usual oozing of blood. On March 20th, six days after the operation, the hemorrhage recurred, and I was this time quite unable to control the bleeding by repacking. The patient was finally taken to the operating room and anesthetized, when it could be seen that the bleeding came from several points in the flaps, and from small granulations in the region of the antrum. Ligatures were applied at several bleeding points and the wound cavity was flushed out with very hot saline, which together stopped the bleeding. The wound cavity has since been tightly packed with iodoform gauze, and there has been no further bleeding. Clotting time of the blood has been five minutes.

THE PRESIDENT wishes to report a case very similar to Dr. Kerrison's. I only will refer to it very briefly. My patient was a boy of twenty-two years, with a very bad history. Two brothers bled to death, following injury, and the mother was a bleeder, which complicated things—but she did not die of hemorrhage. The boy came down twice within death's door,

following injury, and he was taken with grip, and it immediately went to his ears. Both drums were paracentized and he kept on bleeding for a matter of two or three weeks. In the meantime a mastoid developed in one side, which—as Dr. Kerrison said with reference to the packing—I very religiously kept away from. His clotting also at the most was never more than fifteen minutes, and later on it got down to eight minutes and ten minutes, but it went along after about a week to a Bezold abscess. It was a straight Bezold abscess, and there was no particular trouble at the time of the operation, so far as bleeding was concerned. We transfused the boy, gave him 230 c. c. three hours before the operation, by the indirect method, and he was packed and allowed to go for twelve hours, when the bleeding was such that we had to take the packing out, and we gave him 430 c. c. from a properly classified donor, which did not seem to do anything at all in the way of stopping the bleeding, which was a general oozing. He got down so low that the medical men thought he was going to die.

At that time I took the packing out and sewed the wound up just as tight as I could, and that certainly was the one thing, more than even the transfusion, that controlled the thing in his case.

The next day we started in also with thromboplastin, but we injected it into the vein. We gave him three full doses into the vein. Whether as the result of the thromboplastin or a third transfusion, or whether, as it seemed to me, the blood had gotten a grip on itself, the bleeding gradually stopped and the boy went on to an uneventful recovery.

The interesting thing also in the case was that there was never any trouble from the pus that had to be drained through the mastoid wound out of the neck. That fortunately behaved beautifully through it all. I have talked my case over with Dr. Herz, and he regards it as a case of family purpura. He said that if we had had the blood platelets counted they would have been probably below 1,000. Just as in Dr. Kerrison's case, there was the normal coagulation time. I felt very much pleased with the thromboplastin.

Dr. Kerrison: This man has acted pretty well, except that he has had two hemorrhages, and he lost in all more than a pint of blood. The next day he looked normal.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Meeting of March 3, 1919.

THE PRESIDENT, DR. ELMER L. KENYON, PRESIDING.

Syphilis of the Throat.

DR. N. SCHOOLMAN presented a lady, twenty-four years of age, who had been married for nine years. She had one child, who died at the age of three months of convulsions. Subsequently she had a miscarriage at four months. She stated that she was well until about six months ago, except for an injury to her leg which occurred in childhood. At the time of presentation there was quite a marked pathologic condition in her throat. The soft palate was almost adherent to the posterior wall of the pharynx, and she was entirely unable to breathe through her nose. The Wassermann reaction was positive.

DISCUSSION.

DR. L. W. DEAN asked if anyone had ever had even fairly satisfactory results in operating on these cases after the stage of cicatrization had been reached?

DR. H. L. POLLOCK said they had had three or four similar cases in the last three or four years. They did not operate on any of them until they got a negative Wassermann test on the blood and spinal fluid. They operated on them in different ways, turning a flap backwards into the nose and trying to make an adhesion with the flap they separated from the posterior pharyngeal wall and suturing it through. In the first, two catheters were used into the nose for several weeks, and they gradually grew together. In the other two they used an obturator. Every one of the four cases went right back into the same condition they were in before operation. He

had seen several operated previously and every one of them gave an nil result.

In one case they used the tonsil from either side and thought if they could get the mucous membrane over, that would keep it open.

Dr. A. M. Corwin remembered a case which he tried to remedy with the cooperation of the late Dr. Hugh Ferguson. The lad fortunately had his tonsils, for at that time these organs were not being slaughtered as they are today. They turned one of these tonsils partly out and attempted to sew it in place posteriorly in the wound, hoping that it would become adherent in the palatopharyngeal angle, to block the scar retraction as an island of new epithelialization. They thought for a time this was going to be successful, but it sloughed out and the condition was quite as bad as before. He thought, however, that it could be done with very great care and good technic.

Lt. Col. Wishart (Toronto) had not had any better luck with his cases. He said the thought passed through his mind that in the facial work being done in London at Sidcup they had been using a stout dental preparation to implant in the face which, covered with skin graft, allows new epithelial surfaces to form. They had been accomplishing a great deal with that. He wondered whether something of this kind could not be used in these cases. Of course, there was the great difficulty of keeping it in place, but that could be overcome and it would probably prevent shrinking. It occurred to him that something of that kind could be attempted.

Sarcoma of the Tonsils.

Dr. L. W. Dean said that for a number of months he had had in mind reporting this case of sarcoma of the tonsil. He felt justified in reporting any case of sarcoma of the tonsil because of its extreme rarity. It was the only case of sarcoma of the tonsil which he had had. He doubted that anyone would see in a lifetime more than two or three such cases, as up to the present time only about eighty cases of sarcoma of the tonsil had been reported. In this series of cases the one early symptom had been the feeling of a foreign body in

the throat and of some obstruction. Those cases that had been observed after involvement of the extratonsillar tissue had complained of pain. His case was particularly interesting because the patient was under observation for three years without any apparent metastases, dying at the end of that time from a pneumonia which followed influenza. There was no postmortem, so he may have had metastatic growths which were not suspected.

The patient was a man, seventy years of age, and most irritable. He was well nourished for a man of that age. He came in simply complaining of a mass in his throat. The first examination showed several egg shaped, perfectly smooth, light colored masses about an inch in length, growing from the right tonsil. He would not come into the hospital at any time. All that was done for him while he was under observation was to remove these masses as they appeared. The microscopic examination was first made by the pathologist in the University Hospital and confirmed by Albert from the Department of Pathology. Since then different pieces had been examined by two other competent pathologists, and all made the diagnosis of sarcoma. This man in the course of six months or so developed the same type of growth on the left side. They did something they did not very often do. They enucleated his tonsils, using the ordinary procedure without having him stay in the hospital, but they did have him in the immediate neighborhood of the hospital. After removal of the faucial tonsils there was no recurrence in the fossæ of the tonsils. The recurrence began on each side of the lingual tonsil adjacent to the faucial tonsil and extended to the midline. The patient was under their observation for three years. The last time Dr. Dean saw him he came into the clinic, and some one of the assistants removed another crop of these growths. A specimen exhibited was only about one-third of the tumors which were removed during the three years.

In a review of the eighty cases reported he found that those cases which were operated early with enucleation of the tonsils had given a good prognosis. He had always felt that if we could have induced this man to come in and have proper dis-

section of the lingual and faucial tonsils, at least early in the course of his disease, that the whole condition might have been obliterated.

DISCUSSION.

DR. A. M. CORWIN said that a number of years ago he reported offhand to this society a most remarkable case, which Bergeron might remember, as he was associated in the same suite. A strapping big Westerner came to Chicago with terrible griping colic referred to the pit of his stomach. At the time Dr. Corwin saw him he was anasarcous. He had definite kidney findings, indicating active destructive processes. There was no syphilitic history in the case—it was before the days of the Wassermann reaction. He had a growth, melanotic in character, in his left tonsil, which extended down to the side of his tongue and over onto the base, involving the lingual tonsil, where a round tumor interfered considerably with his swallowing. It was a round, firm affair, as big a small hen's egg, which bled freely. He had difficulty in eating, difficulty in swallowing, and was anasarcous. His heart was dilated and revealed a valvular leak.

There was nothing to do but to remove the growth at the base of the tongue. By injecting with adrenalin and cocain, and following that with alcohol, they were able to remove it without hemorrhage. The whole lingual tonsil was affected with these melanotic sarcomatous growths, which proved to be a round cell sarcoma. They painted it with strong silver nitrate every day with the hope of keeping down the secondary infection. There was already a large glandular involvement at the angle of the jaw, evidently an acute infection. At that time Wright of England had been using amylopsins and trypsin on sarcoma, and the patient was given hypodermics of amylopsins and trypsins, and they were also given internally, though this was not recommended. The patient decided to go to Kansas on his way home to die. Because of his tremendously unfavorable condition, there was not a doubt in Dr. Corwin's mind but that he would die. Dr. Billings also made an unfavorable prognosis, with the diagnosis of probable sarcoma of the small intestine and of sarcoma of the base of the tongue. Dr. Corwin corresponded with the pa-

tient's physician after he went home to Montana, and some time later received a long letter saying that the patient had passed a large mass per rectum, following which the urine cleared up, the tongue and tonsil condition cleared up and there was not a remnant of the growth left. He had gained weight and was back at work, evidently in fine shape, as healthy and strong as he had ever been.

DR. CHAS. H. LONG related in connection with this report a case he had some years ago. A young boy, eleven or twelve years old, was brought to a hospital to have tonsils and adenoids removed, which was done. He intended leaving the hospital within a couple of days, but owing to postoperative hemorrhage he was there six weeks. The tonsil and adenoid tissues were examined by Dr. Zeit of Northwestern Medical School, who reported sarcoma. Because of the unfavorable prognosis, Dr. Long advised roentgenotherapy. His associate, Dr. W. F. Coleman, who specialized in electrotherapeutics, suggested the use of a small X-ray tube specially designed for directing the rays into the throat. They gave several exposures, but every treatment seemed to increase the hemorrhage and cause headaches, and the mother decided to terminate treatments and allow the disease to continue its course. He saw the boy occasionally during the year, and, as the growth increased in size, he gradually grew worse with a total nasal obstruction. The tumor, commencing in the adenoid region, continued forward, pressing the contents of the orbit and the antral wall before it, so that the left eye was very much projected, and the nasal septum was forced to the opposite side.

The speaker was called to the house very early one morning —as the boy had experienced a severe attack of coughing and choking and an extra tongue seemed to have made its appearance. Looking into the mouth he noticed that there was a long, dark colored piece of flesh about the size of the little finger lying to the outer side of the tongue. Examination proved it to be one of the branches of the nasopharyngeal tumor. He got permsision to remove a portion of this and had Dr. Zeit examine it, and his report was that it was a fibroma. When he was certain that it was a simple growth and not a sarcoma, he decided to remove it. The body part

of the growth was so large that it was impossible to take it out in any way except through the mouth. An incision was made in the median line through the soft and hard palate, after a preliminary tracheotomy had been performed, and a growth the size of a man's fist was removed.

It was very difficult to get around the pedicle. The roots seemed to extend in many directions, into the pterygoid fossa, mouth and antrum. He took a snare and broke the mucous membrane around the tumor, and then was able to remove it by the aid of curette and fingers.

A very successful result was obtained. The boy was now nearly sixteen years of age; he still saw him occasionally and everything was going nicely. He conferred with Dr. Zeit regarding the difference in the two reports of specimens of tissue examined by him and was informed that in the early stages of these growths it was impossible to differentiate round celled sarcomas from round celled fibromas, therefore, when this boy's tonsils and adenoids were removed, it was impossible to distinguish between sarcoma and fibroma.

DR. N. SCHOOLMAN thought it would be of interest to report a case that attracted considerable attention at the Infirmary recently. A man came to the hospital complaining of very severe headaches and presented a paralysis of the muscles of the right eye. He first came to the Ear Department and was referred to the Eye Department, and while under observation there developed over the right frontal sinus a large, painful, fluctuating swelling, with extensive edema of the right eyelid, entirely closing the eye. There was some tenderness over the left frontal sinus and some slight edema of the left eyelid. His nose on the right side was fairly free; on the left side it was occluded by a mass which would bleed on the slightest examination. The right frontal sinus was opened by a Killian incision, and it was found that the anterior wall of the sinus was necrotic and discharging considerable pus; the intersinus septum was necrotic and pus flowing from the left to the right sinus, so the septum was taken out and both sinuses converted into one large one. A large catheter was passed through the right sinus into the nose. A remarkable thing about this case was that the sinus would almost fill up over night with soft bleeding granulations and the catheter in the nose would be-

come anchored. The pathologic report by Dr. Lane was that it was a rapidly growing carcinoma.

Dr. H. W. Loeb (St. Louis) had seen two cases of sarcoma of the tonsil. In one the diagnosis was not confirmed, because the patient refused any sort of operation. The second case was a woman about sixty years of age, who stated that the mass had been growing for three or four years, and within the previous two months there had been considerable swelling in the anterior cervical glands. A small portion was taken off for diagnosis and the pathologist reported a fibrosarcoma. In view of the fact that the growth was so large it was found necessary to make an incision across the cheek from the upper angle of the mouth. This made it quite easy to remove the growth. After this the cervical glands were removed. The case remained under observation for three years without recurrence, which of course was a surprise, in view of the fact that the glands were involved at the time of operation.

He was particularly interested in Dr. Dean's case.

Dr. Otto Stein reported a case that came under his observation about twelve or fourteen years ago, in which he dissected out a tumor mass in the case of a boy ten years of age. He apparently had a sarcoma in both tonsils. Dr. Stein's diagnosis before any section was made was sarcoma of the tonsils. He was not doing very good dissecting operations at that time and dissected this one under local anesthesia with a great deal of difficulty. He thought he did it very poorly at the time, but it evidently was a very good method. Sections showed the growth to be a round celled sarcoma. He dissected the entire mass, which was about the size of a walnut, from the left tonsil. When he got through with the left tonsil he was tired out and did not care to tackle the right one. There was no particular bleeding at the time. He kept track of this boy through his physician for several years. He had no recurrence on the operated side, and the side not operated cleared up spontaneously.

Dr. Dean (closing) thought from the discussions one important factor could be deduced, namely, that in socalled sarcoma of the tonsil, the prognosis was good, or least fair, if operated early.

***Paper: A Case of Chronic Bilateral Abductor Paralysis of the Vocal Cords (Cricotrytenoidus Posticus) Result of Goiter Operation.**

A. M. CORWIN, M. D.

DISCUSSION.

DR. L. W. DEAN stated that the case which he had was almost identical with this case. He remembered the history very vividly, though it must have been some five or six years since the patient was under his observation. What impressed him most with the case was that the patient was a young lady, about twenty-eight years of age, well educated, a school teacher, with otherwise perfect health, a girl one would dislike to lose in any community. This young lady was operated on for a goiter, and immediately following the operation had a bilateral abductor paralysis. It was about three months after the operation that he saw her. She came to him particularly because of attacks of dyspnea. This patient did not have the good voice which Dr. Corwin's case had; nevertheless she had a fair voice. Examination of the larynx showed an absence of abduction on each side. During deep inspiration there was only the slightest change in the glottis. She had also some expiratory dyspnea. She had attacks of spasm of the adductor.

Dr. Dean was inclined to view the case as one where there was a paralysis of the abductors in accordance with Semon's law. He felt also, because experimental stimulation of the central end of the pneumogastric would cause a spasm of the adductors on the opposite side, that possibly it was not only a paralysis of the recurrent laryngeal but also an irritation of the pneumogastric. At any rate, that was the only satisfactory explanation that they could give for the spasms of the adductors which accompanied the paralysis of the abductors

After studying her for several weeks and keeping her in the hospital and observing these attacks of dyspnea, they advisel a punch operation on the cords. He thought to obliterate sufficient tissue to give her a good breathing space would result in the permanent loss of voice. The operation was refused. His advice then was that in case she had the slightest

*See page 781.

dyspnea she should immediately go into a hospital. This she did, but unfortunately the hospital was not prepared to do a rapid tracheotomy and she died from the dyspnea, the result of laryngeal obstruction. So far as he was concerned, he felt that Dr. Corwin was justified in advising the destruction of one cord, even with the resulting loss of voice.

LT. COL. WISHART had been exceedingly interested in Dr. Corwin's case, because at the present moment they had in the military wards in his own city a case of similar nature, but which apparently differed considerably in the symptoms. The patient was a boy of about twenty-one. Dr. Wishart did not know anything about the previous condition of his thyroid gland, but he knew the patient was operated upon and that the thyroid was removed and subsequently he had lost his voice. He appeared also to have had some chest condition, supposedly tubercular, and was invalided back to Canada without any treatment of his throat, presumably to be treated for tuberculosis, the idea being that he probably would not live very long. His breathing got rapidly worse and he suddenly developed so great an amount of difficulty that a hurried tracheotomy was required. So much scar tissue had formed that now the larynx was twisted, and it was impossible to do more than get a fleeting glimpse of his vocal cords during examination. They could not get any view at all of the larynx with the suspension apparatus. After the patient wore the tracheotomy tube for some time they took it out and tried intubation and then were obliged to do the tracheotomy again. As soon as the intubation tube was taken out he began stertorous breathing. They then split the larynx and dissected out one vocal cord. For some six weeks after that operation he had marked relief in his breathing, and they hoped that everything was going to be satisfactory, but the difficulty reappeared and they have had to put in a tracheotomy tube again. They were in profound difficulty in regard to this young man. He was afraid to leave the hospital because he feared he would get into circumstances at home where he could not be helped, and they really did not know what to do with him, how to give him permanent relief and make him a decent member of society. His chest had markedly improved and he was no longer confronted with immediate dissolution because of a

tuberculosis. Therefore, this case of Dr. Corwin's was exceedingly interesting to the speaker, and he hoped to hear how somebody could relieve this condition.

DR. CORWIN asked why the boy had a return of the dyspnea after the operation.

LT. COL. WISHART said probably on account of the scar. They got only a very small view of the larynx at any time. He thought that probably one would not succeed in seeing it under three or four examinations. It was so much twisted that one could not get a view.

DR. ROBERT GOOD said in regard to Dr. Wishart's case, since the pathology in this case was scar tissue and contradiction, he thought one ought to concentrate one's thought on the scar tissue. In a case like this if the scar tissue was resected on one side only under local anesthesia in an effort to relieve the pressure on the nerve, it would be at least worth trying before resorting to such a procedure as resecting the vocal cord. An anastomosis with the hypoglossal might be possible.

DR. WISHART said that they did that prior to resection of the cord. They cut down through the scar tissue on the left side, but it was so dense that they could not see where the nerve was.

DR. E. L. KENYON supported Dr. Good's suggestion. Since the interior of the larynx was anatomically unimpaired, would it not be possible to produce intentionally a complete paralysis of one cord by a reoperation on the neck? This would serve to throw one cord outwards into the cadaveric position, thus supplying sufficient breathing space, providing the cord on the opposite side did not persistently overadduct beyond the median line. If the condition produced by completely paralyzing one cord persisted, the voice would eventually become normal and remain so. If, however, the overadducting cord, by overlapping the median line, should still prevent free breathing, that cord could by operation on the neck be caused to become completely paralytic, and so take the cadaveric position also. Thus the breathing space would be rendered sufficient, but the voice destroyed. This manner of procedure would seem to present more hope of preserving the voice, as well as providing breathing space, than operation in the larynx, with its danger of scar tissue retractions and its necessary loss of voice.

DR. WISHART said, in answer to Dr. Kenyon's question, that he thought the twisting of the larynx had a great deal to do with the condition.

DR. SONNENSCHEIN mentioned a case he recently saw which had been operated at the County Hospital by Dr. Boot. The patient was a young woman who had had a goiter operation followed by a complete bilateral abductor paralysis. A tracheotomy had to be done. Dr. Boot very carefully cauterized with the galvanic cautery the upper surface of the cords, relying on the scar to draw the cords from the median line. The result was that there was a very small slit between the cords. She still had the dyspnea, but she was up and about, and the tracheotomy wound had healed.

DR. CORWIN, closing, said it was gratifying to have the various expressions coming out of the experiences of the other members, especially that from Dr. Good. This was not a case to be taken lightly or handled under snap judgment. The future comfort and usefulness of this patient depend on a very slight variation of procedure and certain refinements of technic. He saw no reason why cutting the cord in two in the middle and allowing the ends to retract, would be objectionable as far as future scarring was concerned. One doctor told him that the dissection of the cord was submucous. In that case there ought to be a minimum of scar tissue. He expected in the future to have something to say about this case. As to the dissection of the recurrent nerve and its anastomosis with the superior laryngeal, he did not know whether it had ever been done or attempted. From the small size he should consider such a procedure impracticable. The idea of dissecting out the nerves from the mass of scar tissue in which they were both imbedded was hardly to be considered seriously. The high position of the scar and its extent also contraindicates the attempt to cut down on one or both recurrent nerves to sever them completely in order to bring about a cadaveric position of the cords under complete paralysis. This would seem to be desirable since at the present time the cords were under complete adduction, showing that this function of the recurrent was still in force. The abductor function was usually the first to be destroyed under pressure influences upon the nerve.

***Paper: A Study of One Hundred Cases of Suspected Chronic Nasal Accessory Sinus Disease with Report of the X-Ray Findings.**

H. C. BALLENGER, M. D.,

CHICAGO.

DISCUSSION.

LT. COL. WISHART asked if Dr. Ballenger said that one case of polyp of the antrum showed a shadow where the pedicle entered the antrum. His experience with these cases was that there was no shadow in the antrum. He was referring to those cases where there was a pedicle arising from the outer wall of the antrum and passing into the nasal fossa without any nasal involvement or considerable involvement of the antrum wall. In those cases he had not found a shadow.

DR. H. W. LOEB said that he got the impression that the essayist could read a radiogram for diagnostic purposes much better than he could. From a very considerable experience with radiograms the speaker found there was very little to be achieved except by anterior views. In the anterior view the plate comes nearer to the sinus in question than in any other way. He had not been able to detect a difference in the shadows made by abnormal and normal sphenoids by an anterior view. Some years ago, when working with Dr. Carman on some experimental work, he suggested that the sphenoid was nearer to the palate than any other part of the head. Therefore, if a picture could be taken from the palate side it might show differences. He also mentioned this to another radiographer. However, it was only about two years ago that he succeeded in getting one who would take enough interest to experiment with it. In the meantime he thought someone else was doing the same thing. They succeeded in getting a thick celluloid film, which was placed in the mouth and held against the palate by the tongue, and that showed the succession of sinuses very well. They did not have a pathologic case that showed anything until about six months ago. In that case they succeeded in getting a fairly good view of the

*See page 894.

infected sphenoid. He hoped some other members would try this method and thought it would show not only pus in the sphenoid but in the ethmoid. As far as he was concerned, he did not believe that it was possible to detect anything by any lateral view, and considered an anterior view of the sphenoid without any value as far as such differentiation was concerned.

DR. ELMER L. KENYON said that such beautiful X-ray work was done in respect to the teeth that it had been a question in his mind whether for the ethmoid cells a small film might not be introduced into the middle meatus and the ray passed in through the orbit. There seemed to be nothing impossible about this, and it would give a true picture of the ethmoid region.

DR. A. M. CORWIN asked Dr. Ballenger whether he had checked up these plates with the ordinary method of transillumination. Both of these methods had been unsatisfactory at critical times in his experience, and he wondered what Dr. Ballenger's experienec had been in following both procedures in this series.

DR. ROBERT GOOD said regarding the cases that were filled with mucous or polyps in the sinus where the radiograph was negative, if transillumination was used a positive result would be obtained. He thought transillumination was of more value than the X-ray in many of these cases.

DR. BALLENGER, referring to the case of polyp in the antrum, said he could not prove it came from the antrum, but the pedicle had to what he assumed was the nasoantrum opening. It might have come from the ethmoid.

He had nothing else to say except in reading a series of plates there was frequently an element of doubt. Usually with exposures at various angles one could arrive at a fairly definite conclusion.

In answer to Dr. Good, he stated that transillumination had not been made as a routine method in these cases. He had not a great deal of faith in transillumination, except when negative, unless the transillumination revealed a dark antrum on one side and the visual examination revealed pus emerging from beenath the anterior portion of the middle turbinate on the dark side. Barring that, he believed little value was attached to the procedure.

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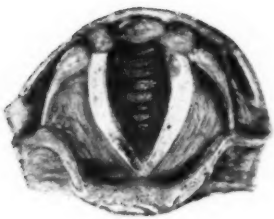
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